NATUR CYMRU

A Review of WILDLIFE in Wales

Rhif/Number 1 • Haf/Summer 2001

- **Jack and the dormouse** … *one man's efforts to save them*
- **The freeing of a river** … *restoring the Afon Ogwen*
- **Puffin Island** … *will removing rats bring back puffins?*
- **Dilyn ffordd natur** … *ymatebion polisi amaeth i glwy'r traed a'r genau*
- **The uplands** … *potential for change*
- **Regular features** … *and lots more*

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Natur Cymru is intended to promote the exchange of information about biodiversity and encourage debate. The views expressed in this magazine are not necessarily those of the sponsors.

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Golygyddol

Croeso i rifyn cyntaf cylchgrawn newydd Cymru am yr amgylchedd a bywyd gwyllt. Mae'n llenwi bwlch a adawyd gan 'Nature in Wales' a oedd yn gylchgrawn poblogaidd iawn a ddechreuodd ei oes ym 1955 ac a ymddangosodd yn rheolaidd am fwy na deng mlynedd ar hugain. Ronald Lockley a ysgrifennodd y rhagarweiniad i'r rhifyn cyntaf o 'Nature in Wales', a llenwyd ei dudalennau gydag arsylwadau uniongyrchol ar fyd natur. Disgrifiwyd bywyd yr arloeswr hwn ar ynys, a'i waith yn ymwneud ag adar môr, mewn mwy na hanner cant o lyfrau. Mae wedi gosod y safon i ni ei ddilyn, fel bod ein tudalennau ni yn dod yn lle i ddysgu am natur yng Nghymru, ac yn ffynhonnell hanfodol i'r naturiaethwr. I'r gweithiwr maes, mae Cymru yn dal yn wlad eithriadol lle mae myrdd o bethau i'w darganfod o hyd.

Ond mae'r agenda amgylcheddol newydd yng Nghymru yn un eang, a bwriadwn adlewyrchu hyn. Gyda phob blwyddyn sy'n mynd heibio, mae'r amgylchedd yn dod yn rhan fwy amlwg o'n bywyd bob dydd. Mae'r cysylltiad rhwng ein ffordd o fyw a'r peryglon, a'r gost fydd yn deillio o hyn yn y dyfodol, yn dod yn fwy amlwg i ni. Fel y dywed Graham Oliver, gall gwely helaeth o fisglod perlog wneud yr un gwaith â chynllun puro afon i dref o 150,000 o bobl. Ond ni ystyriwyd gwerth economaidd y misglod pan ddinistriwyd y boblogaeth fawr ddiwethaf ohonynt gan gynllun draenio.

Mae polisi amaethyddol sy'n seiliedig ar gynhyrchu wedi effeithio'n helaeth ar yr amgylchedd. Mae angen dweud llawer ynghylch cyfeiriadau amaethyddiaeth yn y dyfodol yn sgîl clwy'r traed a'r genau.

Mae Morgan Parry yn edrych ar ffermio ac ôl-effeithiau'r clwy, a Barbara Jones sy'n ystyried sut y gallai llai o bori gan ddefaid wella'r ucheldiroedd. Gyda dyfodiad y Cynulliad Cenedlaethol fe ellir trafod materion fel hyn yn agosach o lawer i'r cynefin, ac mae Michelle Hunt yn rhoi adroddiad ar ychydig o'r materion amgylcheddol sydd wedi dod dan sylw'r Cynulliad.

Ceir llawer mwy yn y cymysgedd o erthyglau sy'n archwilio tynged byd natur, effaith gweithgareddau dynol a sut yr wynebir her gymhleth 'bioamrywiaeth'. Gobeithio y bydd y rhifyn hwn yn rhoi mwynhad a llawer o wybodaeth i chi. Bydd y cynnwys yn datblygu, felly os oes gennych farn bendant ynghylch beth dylem ei drin, hoffwn glywed oddi wrthych. Gwell fyth, anfonwch eich cyfraniadau ataf.

James Robertson

Editorial

Welcome to the first edition of Wales' new magazine about the environment and wildlife. It replaces the much-loved 'Nature in Wales' which began its life in 1955 and appeared regularly for more than thirty years. Ronald Lockley, whose island life and pioneering work on sea-birds was charted in more than fifty books, introduced the first edition, and its pages were filled with first-hand observations of nature. It has set the standard for us to follow, so that our pages become the place to find out about nature in Wales, essential reading for the naturalist. Wales is still an outstanding country for the field worker, and is alive with discoveries waiting to be made.

But the new environmental agenda in Wales is a broad one, and we aim to reflect this breadth. With each passing year the environment moves a little nearer to the centre of public life. The connections are being made now between the way we live and the downstream costs and dangers which we are storing up for ourselves. As Graham Oliver points out, an extensive bed of freshwater pearl mussels might do for nothing the work of an expensive river purification scheme. But the economic value of nature's water purifiers was not part of the equation when their last major Welsh population was destroyed by a drainage scheme.

The environment has been hugely affected by the course of production-orientated agricultural policy, so there is much that needs saying now about future directions for agriculture in the aftermath of the foot and mouth outbreak. Morgan Parry looks at farming after foot and mouth and Barbara Jones considers what a reduction of sheep grazing would do for the uplands. With the arrival of the National Assembly, such issues can now be debated much closer to home, and Michelle Hunt reports on just some of the environmental matters with which the Assembly has been concerned.

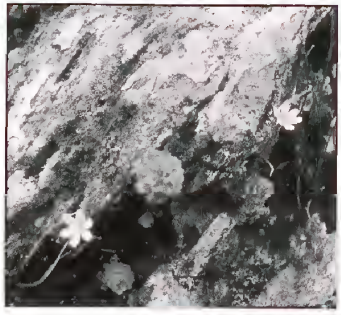
There is much more in this mix of articles which examine the fortunes of nature, the impact of human activities and how the complex challenges of 'biodiversity' are being tackled. I hope you will find this first edition both enjoyable and informative. The recipe will evolve, so if you have strong views about what we should be covering, I would like to hear from you. Better still, send me your contributions.

James Robertson

The Uplands – *potential for change*

Barbara Jones *considers what the removal or reduction of grazing could mean for the upland landscape and its biological diversity, and describes an experiment at Cwm Idwal which could answer the critics who warn about what would happen in the absence of grazing.*

Dwarf shrub heaths would replace most acid grassland above the tree-line and grow in amongst trees in woodlands below this level.



The current upland landscape in Wales is not natural; the wide swathes of short, grazed grasslands in Snowdonia and the purple moor grass dominated moors of central Wales, for example, are the product of years of management, particularly of heavy sheep grazing during the last century. Even the most casual look in any long term grazing exclosures gives an indication of what vegetation we could expect to see with less or with no commercial grazing. This would vary with location but would consist essentially of a wonderful mosaic of woodland, scrub, heaths, wetlands and grasslands. In Snowdonia however, we have 'bald', grass dominated hills, where woodland and heath can only be sustained where stock are excluded. Some woodlands still exist and are open to grazing, but there is little if any regeneration of trees within these, so that when the mature trees die, the woodland will again be replaced by the ubiquitous short grassland. There is virtually nowhere for natural vegetation transitions to develop, particularly with altitude, where woodland grades into scrub, which in turn grades into dwarf shrub heath through to montane grassland and heath.

Concern about the degraded state of much of the Welsh uplands has prompted radical measures in Cwm Idwal, one of the most important upland National Nature Reserves (NNR) in Wales. Located in the Snowdonia mountains, Cwm Idwal was declared as an NNR in 1954, but has been commercially grazed for most of the time since then. However, in 1998, CCW, together with the owners, the National Trust, and the tenant, were able to establish a new management regime which effectively excluded all grazing for an experimental period of at least 50 years. Such a time period is needed as vegetation succession in the uplands is a very slow process. The main reason for this decision was the need to restore the important plant communities for which the Cwm is notified, the rock based arctic-alpines and tall-herb ledge vegetation, together with the sub-montane and montane heaths. Exclusion of grazing, as opposed to grazing reduction, is a relatively drastic measure, one which is not needed or recommended on most land as many plant communities need a certain amount of grazing.

However, the arctic-alpines and the ledge communities do not require grazing and currently are very restricted and limited to inaccessible sites in Cwm Idwal where animals cannot reach. This restricts their reproductive potential, so that populations are small – too small for numbers to provide a buffer against environmental change, and, because they are effectively at the edge of their range, they need as much help as they can get to grow and thrive in the Welsh mountains. Removal of grazing in the Cwm will therefore benefit these vegetation types by allowing them to spread from their currently restricted sites to rocky areas below and adjacent to the cliffs on which they now grow.

An additional reason for excluding grazing was to allow the development of a 'natural' altitudinal vegetation transition from the base to the summit of a mountain in a 'core' area of importance in the Eryri Special Area of Conservation (SAC). As mentioned earlier, such transitions are very rare in the Welsh uplands. This will be a slow process, but there are small woodlands in the valley base and a few scattered trees in exclosures in the Cwm itself to act a seed sources. Trees such as rowan, birch, hawthorn and willow will slowly become established, growing mainly as small trees, but grading into stunted scrubby trees as altitude and exposure increase. Scrub currently has a poor press, with emotive language used to describe the invasion of scrub into the uplands that would follow the removal of grazing, as if it would be plague on the landscape, forming an impenetrable tangle. I have even heard it referred to as poisonous!

What is this scrub though but merely small, stunted trees which normally we value in woodlands? The development of scrub as a natural continuation of valley side woodlands would immeasurably enhance the diversity of our hills. It would attract wildlife, help stabilise soils and add depth and beauty to the landscape. It would grow in association with dwarf shrub heath and even tall-herb ledge vegetation, which is essentially a woodland type of vegetation growing in the shade and protection of northerly facing cliffs. Finally, where the exposure and temperatures become inimical to trees and scrub, heaths and montane grasslands would replace them up to the summits.

It is difficult to predict exactly the trends of change in each locality but generalisations can be made about what would happen to different vegetation types in the absence of, or under reduced grazing. On the highest summits, a sedge-moss heath would be restored with fewer grasses dominating this fragile environment. Dwarf shrub heaths would replace most acid grassland above the tree-line and grow in amongst trees in woodlands below this level. Calcareous, or base-rich grasslands, which support a more diverse suite of herbs than is found in acid grassland, could be retained with a better structure and more flowering plants with lower grazing levels, but with no grazing they may be replaced by tall-herb vegetation or woodland if at a lower altitude. Blanket bogs and wet heaths, without drainage and heavy grazing, would be less degraded, but may develop a scrub or woodland cover at lower altitudes where the ground is not too wet. Woodland cover would extend and influence many of these vegetation types if given the chance, and in doing so would improve the biodiversity and the landscape in many cases.

To restore biological diversity to the uplands, the grazing needs to be controlled so that there is a range of options for different types of vegetation. To achieve this, grazing will need to be removed on a very few key sites, but on most other sites, grazing will be needed at a range of intensities to maintain different plant communities, including some sub-montane heath, calcareous grassland, acid grassland (for some bird species), some blanket bogs or wet heath to prevent scrub encroachment and some woodlands to maintain an open canopy for bryophytes for example. However, current grazing levels are too high at many sites, even where grazing is required so adjustments will need to be made to reach appropriate levels.

The current upland landscape in Wales is unnatural and lacking in biodiversity because of a long history of grazing, particularly in the past 50 or so years. We need a few areas of 'wilderness' where nature could 'let rip', allowing the vegetation to develop unimpeded into whatever its eventual form would be. The Cwm Idwal experiment is currently unique in doing this. Let us hope the momentum can be maintained long enough for the results to speak for themselves.

Barbara Jones is CCW's upland ecologist.

Yr ucheldiroedd – *y newidiadau sy'n bosibl*

Nid yw tirwedd yr ucheldir yng Nghymru ar hyn o bryd yn naturiol. Mae'r clytiau cang o laswelltiroedd sydd wedi eu pori yn Eryri, a'r gweunydd a oruchafir gan laswellt y bwla yng nghanolbarth Cymru, er enghraifft, yn gynnyrch blynyddoedd o reolaeth, yn arbennig pori trwm gan ddefaid yn ystod y ganrif ddiwethaf. Trwy bori ychydig neu ddim o gwbl, byddant yn troi yn ôl yn frithwaith rhyfeddol o goedlannau, prysgwydd, rhostiroedd, gwlyptiroedd a glaswelltiroedd.

Ystyrir prysgwydd weithiau yn fygythiad i harddwch yr ucheldiroedd, ond mae'n cynnwys coed a llwyni bychain yr ydym yn eu gwerthfawrogi mewn coedlannau. Yn ardaloedd yr ucheldir mae'r prysgwydd yn annhebyg o fod yn drwchus, ac maent yn diflannu mewn ardaloedd uwch a mwy amlwg. Mae arbrawf yng Nghwm Idwal i symud defaid oddi yno a chaniatáu i blanhigion creigiog, alpinaidd ailsefydlu, eisoes yn dangos cyn lleied sydd i'w ofni o ddirwyn pori i ben. Er bod pori yn werthfawr mewn llawer o fannau, byddai llawer o fanteision, nid yn lleiaf i'r dirwedd ac i fywyd gwyllt, o gael ychydig mwy o ardaloedd yn yr ucheldir lle nad oes pori arnynt fel y gallant ddatblygu'n naturiol.

Dilyn ffordd natur – *Ymatebion polisi amaeth i gluy'r traed a'r genau*

Mae ***Morgan Parry*** *yn ystyried dyfodol polisïau amaethyddol yn sgîl clwy'r traed a'r genau.*

Bydd epidemig clwy'r traed a'r genau 2001 yn cael ei weld fel trobwynt i bolisi gwledig yng Nghymru, ac er bod llawer o gynlluniau ar gyfer cefn gwlad mewn bodolaeth cyn i'r clefyd daro, bydd gwleidyddion a llunwyr polisïau yn fwy parod i'w derbyn yn dilyn y clwy hwn. Cyflwynodd Fforwm Gwledig Cymru ei argymhellion i'r Cynulliad yn ddiweddar gan ddadlau'n gryf dros agwedd strategol ac integredig. Ond ychydig o sylw a roddodd y Fforwm i'r prif resymau dros golli bioamrywiaeth yng nghefn gwlad. O safbwynt amgylcheddol, mae'n bosibl y bydd angen agwedd mwy cynhwysfawr a radical.

Bydd economeg amaethyddiaeth wrth galon y ddadl, ac mae'n rhaid i gadwraethwyr gydnabod y sectorau sy'n cael budd breintiedig o'r diwydiant a chysylltu â hwy. Roedd y dirywiad yn hyfywdra amaethyddiaeth yn digwydd ymhell cyn ymlediad clwy'r traed a'r genau. Yn ôl y ffigurau mwyaf diweddar (Cynulliad Cenedlaethol Cymru, 2001) bu gostyngiad o 19% yng nghyfraniad net amaethyddiaeth i GDP Cymru rhwng 1998 a 2000. Gostyngodd o ychydig o dan £400 miliwn i tua £320 miliwn. Dros yr un cyfnod lleihaodd yr incwm net o amaethyddiaeth o ychydig o dan £68.9 miliwn i golled o £2.6 miliwn. Ychwanegodd cryfder y bunt o'i chymharu â'r Ewro, ac effaith argyfwng BSE at y dirywiad, gan effeithio ar amaethyddiaeth ym Mhrydain yn fwy nag yng ngwledydd eraill Ewrop.

Mae'r ymateb traddodiadol i ostyngiad mewn elw mewn unrhyw ddiwydiant yn ddeublyg. Yr ymateb cyntaf yw ceisio arbed costau neu gynyddu'r cynnyrch, sydd ym myd amaethyddiaeth yn golygu dwysáu. Dros y cyfnod 1997-99, bu cynnydd mewn niferoedd defaid o 7% mewn llawer o ardaloedd yn yr ucheldir. Roedd hyn yn parhau'r cynnydd ym maint diadell Cymru: Dros hanner can mlynedd chwyddodd o 4 miliwn i 11.5 miliwn gyda chefnogaeth oddi wrth y Polisi Amaethyddol Cyffredin. Yr ail yw sicrhau economïau drwy leihau nifer y bobl a gyflogir ac uno daliadau i greu ffermydd mwy. Gallai hyn effeithio ar hyfywdra cymunedau a diwylliant mewn ardaloedd yn yr ucheldir oni bai bod gweithgareddau economaidd eraill yn cael eu cyflwyno. Bydd penderfyniadau ynglŷn â pholisi domestig yn y misoedd i ddod yn ceisio achub y blaen ar y ddau ffactor hwn a lliniaru eu heffeithiau.

Dyfodol ffermio a'r effaith ar fywyd gwyllt

Bydd dyfodol bywyd gwyllt Cymru yn dibynnu cymaint ar ganlyniad y ddadl hon ag ar ein gallu i warchod rhywogaethau ar Safleoedd o Ddiddordeb Gwyddonol Arbennig a gwarchodfeydd natur, oherwydd bod bioamrywiaeth Cymru yn bodoli i raddau helaeth iawn y tu allan i ardaloedd a warchodir. Y tu ôl i'r ddadl ynglŷn â'n bywyd gwyllt, ceir grymoedd sy'n dibynnu mwy ar bolisïau rhyngwladol a phwysau gan ddefnyddwyr nag ar benderfyniadau a gymerir gan ein cynrychiolwyr etholedig. Mae ad-drefnu'r Polisi Amaethyddol Cyffredin ar yr agenda wleidyddol Ewropeaidd ond nid ymddangosodd fel pwnc pwysig hyd yn oed mewn etholaethau gwledig yn ystod yr etholiad cyffredinol diweddar yn y DG. Yn yr un modd ni chafodd y symudiad diwyro tuag at farchnad fyd-eang mewn bwyd, heb unrhyw gyfyngiadau arni, ei herio gan unrhyw blaid wleidyddol fawr. Mae hyn efallai yn cael mwy o effaith ar fywyd gwyllt yma ac o amgylch y byd nag unrhyw bolisi domestig arall.

Un ateb i'r broblem fyddai mabwysiadu cynllunio defnydd tir fel teclyn i'w ddefnyddio. Gallem rannu Cymru yn dri dosbarth bras gyda ffermio 'cydnaws â natur' yn dod yn norm dros y rhan fwyaf o'r iseldiroedd. Yn y dosbarth hwn, byddai ffermio cymysg yn cynhyrchu bwyd o ansawdd uchel gyda brand Cymreig iddo. Byddai'n mynd yn fwy a mwy organig ac yn dibynnu llai ar dda byw. Hefyd, o dan ddylanwad defnyddwyr goleuedig ac archfarchnadoedd cyfrifol, byddai'n cynhyrchu amrywiaeth cynyddol o lysiau, cnydau a chynhyrchion garddwriaethol i'r farchnad leol.

Byddai'r ail ddosbarth yn cydnabod y dylai ffermio dwys barhau ar y tir amaethyddol mwyaf cynhyrchiol, o dan reoliadau amgylcheddol a rheoliadau lles llym. Byddai hyn yn cynhyrchu bwyd ar gyfer marchnad enfawr heb gymorthdaliadau cyhoeddus o gwbl. Hyd yn oed yma, dylai'r math o amaethyddiaeth ddibynnu'n hollol ar y safle, dylai barchu amgylchiadau naturiol a chynhenid hinsawdd, daeareg a hydroleg yr ardal ac ni ddylai ddisbyddu ffrwythlondeb y pridd na llygru cyrsiau dŵr.

Byddai'r trydydd dosbarth yn cydnabod ein hangen i gynyddu'r tir sydd ar gael i fywyd gwyllt a phrosesau naturiol, a byddai'n dir a fyddai'n cael ei gymryd allan o amaethyddiaeth. Byddai mynyddir a gwlyptiroedd yn elwa yn ecolegol o hyn, ond mae'n aneglur ar y funud sut fydd hyn yn digwydd trwy newidiadau ym mholisi'r Llywodraeth, heblaw ei bod yn cyfyngu ar grantiau a chwotáu.

Er bod cynllunio strategol fel hyn yn dringo i fyny agenda'r Cynulliad, nid oes unrhyw fecaniaethau ar gael ar hyn o bryd i weithredu dull o'r fath yng nghyswllt yr amgylchedd. Wedi clwy'r traed a'r genau, rhaid defnyddio'r mecaniaethau sydd ar gael yn fwy effeithiol.

Rôl cynlluniau amaeth-amgylchedd

Un offeryn polisi domestig y mae gan lawer o gadwraethwyr lawer o ffydd ynddo yw'r cynllun amaeth-amgylchedd. Mae gan y cynlluniau hyn botensial i wyrdroi dirywiad bywyd gwyllt yn y cefn gwlad sy'n cael ei amaethu drwy dalu i ffermwyr am warchod ffactorau amgylcheddol yn ogystal â thyfu bwyd. Mae cyrff amgylcheddol fel WWF wedi dadlau y dylai cymorthdaliadau am gynhyrchu bwyd gael eu dirwyn i ben yn gyflym a'u disodli gan daliadau amaeth-amgylchedd drwy ehangu'n gyflym ar gynlluniau fel Tir Gofal. Cynyddodd ardaloedd o dir amaethyddol o dan ryw fath o reolaeth amaeth-amgylchedd fwy na 15 gwaith rhwng 1987 ac 1998. Ond dadleua grwpiau amgylcheddol fod yr adnoddau a roddir i raglenni amaeth-amgylchedd yn gwbl annigonol i gwrdd â'r anghenion.

Amcangyfrifa WWF y byddai angen £92 miliwn y flwyddyn i gyflawni ei set lawn o amcanion ar gyfer cynlluniau amaeth-amgylchedd yng Nghymru. Ond mae eraill yn amau a yw cynhyrchu bwyd a chymunedau amgylcheddol eu hunain yn nwyddau cyhoeddus, i'w cefnogi'n ariannol er eu mwyn eu hunain. Hefyd, a ddylai'r nwyddau amgylcheddol yn unig (bioamrywiaeth, tirwedd a dŵr croyw) gael eu cefnogi o'r pwrs cyhoeddus?

Mae pryderon nad yw Tir Gofal dair blynedd ar ôl ei lansio – yn cyflwyno'r manteision y gobeithid amdanynt er gwaethaf llawer o lwyddiannau unigol. Dangosodd astudiaeth gan WWF a gyhoeddwyd ym Mai 2001 fod gan ffermwyr eu hunain brofiadau cymysg iawn o'r cynllun. Cafwyd tri dosbarth bras o ymateb mewn ymholiadau gyda ffermwyr. Yn gyntaf ceir y rhai nad ydynt eto wedi cael mynediad i'r cynllun ond a allent lwyddo i ymuno petai mwy o gyllid ar gael. Mae gan rai brofiad o Dir Cymen ac mae eu hagwedd yn gyffredinol yn ffafriol, oherwydd eu bod yn bwriadu diogelu a gwella cynefinoedd bywyd gwyllt. Mae eraill nad ydynt erioed wedi bod mewn cynllun amaeth-amgylchedd ac maent ar hyn o bryd yn cynhyrchu'n ddwys.

Yn ail, ceir y rhai hynny sydd â phrofiadau ffafriol o gynlluniau amaeth-amgylchedd ac sy'n gobeithio parhau ac ehangu eu hymrwymiad iddynt. Datgela'r arolwg rai sgîl-gynhyrchion diddorol – diddordeb sy'n datblygu mewn marchnadoedd ffermwyr, prosiectau twristiaeth ar ffermydd a chynlluniau bwyd lleol. Ond mae rhai ffermwyr eraill yn credu'n bendant nad yw twristiaeth a gwarchod natur yn mynd law yn llaw, ac yn gwrthwynebu'r pwysau ar ffermwyr i arall-gyfeirio. Yn drydydd, ceir rhai sydd wedi bod yn rhan o Dir Cymen neu Dir Gofal ond nad ydynt bellach yn ystyried bod yr ysgogiadau ariannol a gynigir yn ddigonol i sicrhau eu goroesiad ariannol. Mae'r ffermwyr hyn bellach yn dychwelyd at gynhyrchu da byw yn ddwys, gyda chefnogaeth taliadau'r Polisi Amaethyddol Cyffredin. Gallai canlyniadau newid o'r fath gynnwys mwy o ddefnydd o gemegau, cyfraddau stocio uwch ac ecsbloitio coedlannau lled naturiol.

Ailgyfeirio polisïau tuag at gynnal datblygiad cefn gwlad

Newid arall mewn polisi sy'n debygol yw symud tuag at fentrau heb fod yn rhai amaethyddol drwy Reoliad Datblygiad Gwledig yr Undeb Ewropeaidd. Gellir cefnogi cynlluniau amaeth-amgylchedd hefyd drwy'r Rheoliad hwn, a ddehonglwyd yng Nghymru drwy Gynllun Datblygiad Gwledig y Cynulliad. Anogir tirfeddianwyr hefyd i symud at dwristiaeth, cnydau egni a rheoli coedlannau, y byddai llawer ohonynt yn well i fywyd gwyllt na ffermio dwys. Collodd fersiwn gyntaf y Cynllun Datblygiad Gwledig (CDG) a gyhoeddwyd yn 2000 gyfle i droi cyllid sylweddol at fentrau newydd. Oherwydd adranoli o fewn y Llywodraeth ar bob lefel, ystyrir y CDG fel offeryn cul i ychwanegu at gefnogaeth amaethyddol, yn hytrach na ffordd o gryfhau'r cysylltiadau rhwng ffermio ac elfennau eraill o'r economi wledig. Mae angen hyrwyddo llawer mwy nag a wneir ar hyn o bryd ar gynhyrchu organig a dulliau eraill sy'n gydnaws â natur. Mae cefnogaeth i drosi ar gael ond ar ôl hynny mae ffermwyr ar eu pen eu hunain. Yn y DG y rhwystr yw'r Trysorlys. Nid yw hwnnw'n ystyried bod gennym fethiant yn y farchnad sydd angen ei gywiro gan gymhorthdal cyhoeddus. Hefyd, gellid dadlau os na ddylai amaethyddiaeth ddiwydiannol dderbyn cymorthdaliadau yna ni ddylai ffermio organig eu derbyn ychwaith.

Bydd y farchnad fyd-eang, a rôl defnyddwyr o'i mewn, yn y pen draw yn ffactor a fydd yn holl bwysig, ac yn un sydd i raddau helaeth wedi mynd allan o reolaeth llywodraethau cenedlaethol. Mae deialog yn dechrau ar hyn o bryd rhwng y ffermwyr hynny a'r amgylcheddwyr sy'n cydnabod y dimensiwn hwn. Yn sail i'r ddadl hon mae'r ofn y bydd y farchnad fyd-eang sydd wedi ei dadreoli yn ei gwneud yn bosibl i fwyd rhad gael ei fewnforio o rannau o'r byd lle nad oes unrhyw bwyslais o gwbl yn cael ei roi ar bryderon amgylcheddol.

Os ydym yn mynd i roi ystyriaeth o ddifrif i leihau ein heffaith ecolegol, byd-eang, rhaid i fewnforio bwyd y gellid ei gynhyrchu yn y wlad hon fod, heb os, yn agos at frig ein rhestr o bethau i'w dileu. Rydym wedi cymryd camau mawr tuag at warchod ein safleoedd bywyd gwyllt pwysicaf ein hunain, ond rydym yn parhau i ymelwa'n ddiarwybod ar rai gwledydd sy'n datblygu er mwyn cael bwyd rhad. Bydd datrys y dilema hwn yn ennill cefnogaeth gan bawb sy'n pryderu am ddyfodol bywyd gwyllt yma a thramor. Ond mae'r ateb yn ddibynnol ar newidiadau ar ddwy ochr y ddadl.

Mae angen i ffermwyr gydnabod nad yw cludiant rhad (h.y. tanwydd) yn rhan o'r ateb i'w problemau. Un o'r ffyrdd gorau o gywiro costau amgylcheddol bwyd wedi ei fewnforio yw gosod trethi uwch ar danwydd y ffyrdd a thanwydd awyrennau. Cydnabu'r Comisiwn Ewropeaidd yn ddiweddar oblygiadau traws-genedlaethol hyn yn eu drafft diweddar o'r Strategaeth Datblygiad Cynaliadwy a argymhellodd safoni trethi ynni ar draws Ewrop. Byddai talu gwir gostau mewnforio bwyd yn gwneud cynnyrch cartref yn rhatach, ond i'r gwrthwyneb byddai hefyd yn gwneud ein hallforion ein hunain yn llai cystadleuol dramor.

Yn hytrach na chynhyrchu gormod o dda byw (megis defaid) i'w hallforio, dylem gynyddu amrediad y bwydydd a gynhyrchwn gartref. Gall cynhyrchu amaethyddol mwy amrywiol fod â goblygiadau amgylcheddol cadarnhaol, sy'n rhy gymhleth i'w trin yma. Byddai ffermwyr yn sicr yn elwa o leihau eu dibyniaeth ar un cynnyrch fel nad yw clefydau fel clwy'r traed a'r genau yn dinistrio eu bywoliaeth. Bydd ymwrthod â chystadlu trwy ddefnyddio mewnforion rhad hefyd yn ei gwneud yn ofynnol i ni addysgu'r defnyddiwr a diwygio'r sector manwerthu, pynciau a fydd yn sicr o gael eu trafod mewn mannau eraill yn y misoedd i ddod. Ond os gellir cyflawni hyn gall arwain at adfywiad mawr ym mywyd gwyllt Cymru.

Morgan Parry yw Pennaeth WWF (y Gronfa Natur Fyd-Eang) yng Nghymru. Ffoniwch 01286 676826 neu e-bostiwch mparry@wwf.org.uk
Gwefan www.wwf-uk.org

A return to nature? – *Policy responses to foot and mouth*

The Foot and Mouth epidemic of 2001 will be seen as a watershed for rural policy in Wales. Politicians may be more receptive now to policies which address biodiversity needs, and the diversification of the rural economy. The contribution of agriculture to the economy was already declining before the onset of foot and mouth. The viability of community and culture in upland areas may suffer if other economic activities are not introduced.

The future of Wales' wildlife will depend as much on changing rural policy as on our ability to conserve species on SSSIs and nature reserves, since the vast majority of Wales' biodiversity exists outside protected areas. International policies, such as the reform of CAP, and consumer pressures may shape the future. While immediate hopes will be pinned on the growing role played by agri-environment schemes, in the medium term, land-use planning might be used to establish broad categories of 'nature friendly' farming, unsubsidised agriculture and land taken out of production for other purposes, such as wildlfe conservation and environmental protection.

Farmers have as much to fear as environmentalists from a deregulated global marketplace which encourages imports from countries where environmental concerns play no part, and a dialogue between the groups is now essential. Farmers would surely benefit from a more diverse agriculture geared to domestic demand, reducing their reliance on one product so that relatively minor diseases such as foot and mouth don't devastate their livelihoods. Getting off the cheap food treadmill will also require us to educate the consumer and reform the retail sector; but if it can be achieved it may result in a major revival for Wales' wildlife.

A study of **red squirrels** *in Clocaenog Forest*

A symbol of our native wildlife, red squirrels may prove a test for our collective resolve to achieve wildlife conservation. Here ***Sarah Cartmel*** *reports on her research in a remaining red squirrel stronghold, which looked for answers to some of the questions about what red squirrels need for their survival.*

The research in Clocaenog has shown that red squirrels seem to be able to adapt to certain forestry operations such as thinning provided that there is some other suitable habitat in the vicinity of the work.

The red squirrel population has declined considerably in the past 40 years in Wales. A combination of disease, loss of habitat and the introduction of the grey squirrel have left just a few isolated populations in conifer forests. Although the decline has been slower than in England, we now face the possibility that red squirrels will become extinct in Wales unless some positive action is taken.

Clocaenog Forest, near Ruthin, in Denbighshire is a large conifer forest of about 6,000 ha. probably containing the largest remaining population of red squirrels in Wales. Research took place in Clocaenog Forest over an 8 year period between 1992 and 2000 to determine the red squirrel population viability and their habitat requirements. The forest is unusual in that grey squirrels are also present but have not 'pushed out' their red cousins, as has been the case in most other forests in Wales.

The red squirrel population size remained fairly stable during the 8 years of the study; they existed at very low densities (1 squirrel to every 3 ha), which is comparable to populations in conifer forests in northern England. The grey squirrels were found to be mostly transient, invading the forest during peak coning years and then retreating to the borders of the forest where there was access to broadleaved trees. The reasons for this hold the key to red squirrel suvival.

The seeds of survival

As with most mammals one of the main factors affecting the size of the squirrel population is the availability of food. Squirrels feed mostly on the seeds of trees, but most tree species do not produce a large quantity of seed every year and the size and energy content of the seeds varies not only between tree species but also from year to year within species. For instance Sitka spruce, the main tree species found in conifer forests, usually produces a large seed crop every two to three years. Its seeds are small, relatively low in energy content, and most critically, the seeds are shed from the cones within a few months after they ripen. The food source is relatively short term for squirrels, although they do take advantage of it.

Norway spruce, which is less commonly planted in commercial forests, will only produce a large cone crop every 5 to 8 years but it does produce large cones with a large number of seeds. The main advantage to squirrels is that Norway spruce seed can remain in the cones for up to two years. Often cones that have dropped to the forest floor still contain seed and the seeds will stay there until something comes along and eats them. They therefore provide a 'larder' for the squirrels. So despite coning more irregularly, Norway spruce can provide a more stable food supply. This tree species was found to be favoured by red squirrel populations throughout the UK. However, Norway spruce only supplies enough food for a species existing at a low density with fairly low energy requirements.

The work in Clocaenog has shown that over a long period this seed supply is not sufficient to maintain a population of grey squirrels but it can maintain a population of reds. The grey squirrels will feed in Norway spruce during 'mast' years (years of peak coning) but once the food supply diminishes the greys move off in search of better feeding whilst the red squirrels remain.

The presence of the grey squirrels will reduce the fecundity and juvenile survival of the red squirrels during these influxes but so far this has not been sufficient to lower the population to a critical level. If greys were controlled at these times of peak coning to reduce this effect then the red squirrel would stand a better chance of surviving.

Scots pine is also a tree species favoured by both squirrel species. This produces seed in most years and the seeds are high in energy. When Scots pines are present in an area of Norway spruce they will act as a food 'stop gap' when the spruce is not coning, and this combination of tree species has been found to be the red squirrels' most favoured habitat.

What forests can offer

The variety and quality of the trees present in a forest are very important for the long-term viability of the red squirrels, which need a sufficiently large food supply to support a breeding population. However, Clocaenog Forest, as with many of the remaining red squirrel refuges, is a commercial conifer plantation and the habitat is continually changing. The research in Clocaenog has shown that red squirrels seem to be able to adapt to certain forestry operations such as thinning provided that there is some other suitable habitat in the vicinity of the work.

Many commercial forests contain large tracts which are clear felled, and this creates a very fragmented habitat for the squirrels. Red squirrels (unlike greys) are very reluctant to cross clear fell areas; I found in Clocaenog that they were especially vulnerable to predation from foxes and goshawks in these situations. In a fragmented forest red squirrels will move around between feeding sites, but they require safe links between these areas. This would preferably be a stand of less suitable habitat such as Sitka spruce or at the absolute minimum a hedge line. A small isolated block of good habitat is no use to a squirrel.

When design plans are drawn up these linking blocks must be taken into consideration. In Clocaenog a system of clearing smaller areas is being introduced, using the rule that a coupe of trees cannot be felled if there is a coupe less than 5 years old adjacent. This should increase the ground cover available to the squirrels. At present we are exploring various Geographical Information System models that could be incorporated into the design planning system at the local district level. These could be used to predict how various management options might affect the squirrel population. This work is in its early stages but offers a very positive and visual way forward for foresters.

Sarah Cartmel carried out research on red squirrels in Clocaenog forest for her PhD, and the work was funded by the Forestry Commission and Countryside Council for Wales. Her research has identified a list of management guidelines, which can be applied to similar conifer forests. For further details on these guidelines please contact Sarah direct on: 01766 762437.

Y wiwer goch *yng Nghoedwig Clocaenog*

Mae clefyd, colli cynefin a chyflwyno'r wiwer lwyd wedi lleihau niferoedd y gwiwerod cochion i ychydig o boblogaethau ynysig mewn coedwigoedd conwydd. Un o'r mwyaf o'r rhain yw Coedwig Clocaenog, lle mae astudiaeth wyth mlynedd wedi datgelu cyfrinachau am oroesiad y wiwer goch. Nid yw gwiwerod llwyd yn dod o hyd i ddigon o fwyd o fewn y goedwig i gynnal poblogaeth barhaus. Maent yn mynd i mewn i'r goedwig i fwyta hadau conwydd dim ond pan fo'r rhain yn lluosog, ac yna ymgilio i'r ymylon.

Gall y wiwer goch gynnal poblogaeth barhaus, ond isel, drwy fwyta hadau sbriwsen Norwy yn arbennig. Er mai dim ond bob ryw ychydig o flynyddoedd y mae sbriwsen Norwy yn cynhyrchu llawer iawn o hadau, gall y conau orwedd ar y ddaear am hyd at ddwy flynedd, gan ddarparu ffynhonnell o fwyd i wiwerod cochion drwy gydol yr amser hwnnw. Gall deall sut y gall gwiwerod cochion oroesi yn y goedwig fod o gymorth i ddylanwadu ar y modd y mae'n cael ei rheoli. Mae'n bosibl y bydd angen gweithredu'n gadarnhaol i atal y wiwer goch rhag diflannu yng Nghymru.

Jack *and the dormouse*

Since dormice were discovered in one wooded corner of Meirionnydd, one man's enthusiasm has been an essential part of efforts to save them, as ***Wendy Joss*** *explains.*

What was peculiar about these finds were that the nuts were found underneath remnant hazel hedgerows in dense conifer crops.

When I started working for Forest Enterprise in Dolgellau as the Conservation Manager, I was introduced to a man named Jack Grasse. The staff here referred to him as the dormouse guy. I assumed that there was a reason for this nickname, maybe he was small and round with big eyes and slept a lot. (Well he didn't sleep a lot anyway!) The name was actually a reference to the work that he was involved with in improving habitat for dormice on Forest Enterprise land near Pantperthog.

I had been involved with a number of small mammal studies in the UK and was amazed to hear that the dormouse could exist here on the western edge of Wales. Surely it was too damp, too cold and certainly dormice were not a species well known for surviving in conifers. Or were they?

I met Jack at his cottage. Everywhere I looked there were shelves upon shelves of wildlife and nature books. This guy was either very well read in wildlife or extremely rich with a taste for books. From one of the shelves he produced a small booklet with information, photographs and drawings of dormice.

Jack explained how the Pantperthog Dormouse Project got underway. In 1993, a nation-wide survey was launched, called 'The Great Nut Hunt'. This nut hunt was a way to involve local people to get to know what was living in and around their backyard.

Dormice discovered

To Forest Enterprises' amazement, hazelnuts opened by dormice were found in 3 locations south of Cadair Idris. There were only a handful of these nuts recovered but for the first time in over 100 years we have evidence that dormice are present in Gwynedd. What was peculiar about these finds was that the nuts were found underneath remnant hazel hedgerows in dense conifer crops. These hedgerows were the remains of the old field boundaries of Pantperthog farm. Starting in the 1940s, the Forestry Commission bought much of the land surrounding the farm and planted the fields with fast growing conifers.

Until then, Pantperthog would have been a thriving farm with small fields surrounded by managed hedgerows, native woodland and open hilltop pasture. Dormice would have thrived too. What is amazing is that they have survived over 60 years in a deteriorating habitat. As the conifers grew, the hedgerows became shaded out and nut production dropped as a result. The native woodland became fragmented and now only survives in small pockets, none of which are connected to the hedgerows anymore. Now the hedges were nearly dead and only producing a handful of nuts. How were the dormice surviving in such conditions?

The mammal ecologists tell us that the ideal habitat for a dormouse is a mixed broadleaf woodland, with a good diverse shrub layer and plenty of hazel. The habitat in Pantperthog was anything but diverse. Immediate action was needed if Forest Enterprise were to hold on to its dormice. My predecessor, Martin Garnett and Jack approached the Forest District Manager, with a request to improve the forest habitat for dormice. The response was very positive and six hectares at Pantperthog was earmarked for habitat management and improvement.

The priority on the site was to open up the hedgerows. This would allow light onto the hazel and halt the deterioration of the trees and hopefully promote nut production. And so began the small-scale systematic clear-felling of productive conifers for the benefit of conservation. It was the beginning of a unique project to save and maintain a species which would involve a huge amount of experimental habitat restoration as well as the commitment of local residents, staff at the Dolgellau Forest District Office and, more recently, young adults from the local college and Forest Research.

Pioneering habitat restoration

In the late 1980s and early 90s the Forestry Commission in Wales had been involved with some habitat restoration projects like that for black grouse. In 1993 Species Action Plans were unheard of and large-scale felling of planted conifers and long term retention of forest areas to benefit conservation was still a relatively new concept! Today 6 hectares is just the tip of iceberg when it comes to habitat restoration on Forest Enterprise managed land. Manipulation of forest structure, species composition, the clearance of forest to restore non-woodland habitat and the restoration of native woodlands mark FE's contribution to the UK Biodiversity Action Plans.

Once the first area had been clear felled, cut up into small pieces and stacked in habitat piles, it became apparent that the habitat that had been created by the clear felling was unsuitable for dormice. Richard Thomson, a Forester from Canolbarth Forest District, visited the site and he too realised that the clear felling was not the right answer for Pantperthog's dormice. He suggested bench felling the remaining conifers in the field. Trees were cut at breast height or higher and left to fall, allowing light in but maintaining structure.

Dormice will rarely cross distances on the ground. They are an arboreal species, spending over 95% of their time off the ground. They will climb 60 feet or more into the tree canopy to avoid having to travel on the ground. The trees, which now lay whole on the ground, became the perfect habitat for dormouse foodplants like brambles, honeysuckle and other climbing plants to colonise. They also created immediate cover, important for survival from predators.

Outside the field boundaries was a small area of surviving hazel, birch and oak, underplanted with larch and Norway Spruce. These trees were much larger than the sitka spruce that was planted in the fields. Bench felling was not an option. It would have caused too much damage to the surviving broadleaves. It was decided to experiment with ring barking. This is a method of killing standing trees slowly without removing them from site. By taking a chainsaw and cutting a ring around the bottom of the tree in the bark, nutrients from the soil are prevented from reaching the leaves, starving the tree of life. This sounds pretty dramatic, although it can take up to 3 years to kill the tree. It is not recommended near public access or residential sites. It may take a further 10 years for the tree to actually fall. Once the trees have died, more light can reach the ground and the surviving broadleaves, which, in turn will create a more diverse habitat.

A planting scheme was devised in the areas recently clear felled, hazel being the main species. The hazel was of local origin, which is now a Forestry Commission policy when it comes to planting native trees. Jack would drive around the forest roads and dig up regenerating hazel and within hours a small native hazel woodland began to take shape. This planting has continued for the last seven years, increasing the value of the site to the local community and Forest Enterprise as well as to the dormouse.

Part of the national picture

Seven years ago a nationwide nest box scheme was set up by The Mammal Society. Pantperthog seemed the perfect site to include. Fifty boxes were designed, built and erected by Jack. They were made from drainpipe, roofing felt and a small hole was drilled in each tube for the entrance hole. They were placed in the hedgerows at 10m intervals with the holes facing inwards, mainly to restrict birds from nesting, while allowing the dormice to enter from the tree side. The plastic drainpipe was used mainly because the site was located in one of Wales' wettest areas and it was believed that if the boxes were made of wood they would deteriorate quickly. Dormice have been found in the boxes every year, although the numbers are only small.

The Dormouse is protected under the Wildlife and Countryside Act as a Schedule 5 species. A UK Biodiversity Species Action Plan (SAP) has been written in an attempt to maintain and increase the surviving populations throughout the UK. However, the question of dormice in conifers has not been addressed.

At a recent conference held in Cheddar, Somerset, over 80 people turned up to share their dormouse stories. Over 10 of those people were Forest Enterprise staff, all from various districts throughout England and Wales. What was clear was that Pantperthog was not alone in the dormouse and conifers debate. There were other individuals at the conference who had similar stories to tell, such as the couple who have dormice surviving in complete isolation in a scots pine woodland with no broadleaves or understory of hazel and bramble. It was only through checking their recently erected bird boxes that they discovered dormice.

Jack, myself and we guess 70% of the group were interested in some form of explanation, advice or help with the habitat management for dormice in

conifers. Was the clear felling of conifers disturbing the dormouse or removing their habitat? Unfortunately, there were no answers. All the previous dormouse studies had been in southern England in broadleaved, coppiced woodland. Through talking to people at the conference we discovered one individual who had found a dormouse in a moth trap, chomping away on a big fat moth. Was this how they were surviving in habitats with no hazel, or little diversity: eating insects and aphids which are available all year round and which can be found in the canopy and on the bark of conifers? Insects and aphids are a great source of protein and high in fats; an ideal diet for dormice.

Within the last year we have become very involved with Forest Research regarding the conifers and dormouse debate. A project has been set up to identify and radio track 2 populations of dormice, which are surviving in conifers. This information will give us a clearer picture of dormouse behaviour and habitat preference. In the long term it will help inform our decisions about how best to restore Plantations on Ancient Woodland Sites (PAWS). To assist us, a nation-wide survey of the condition of these PAWS sites is nearing completion and we will also have the dormouse study results. When these are gathered together we hope to have a greater capacity to make positive decisions regarding the restoration of our native woodlands. This information should benefit the management of trees and dormice, and also be of value to all those who have helped with this and similar projects.

One final word. Without Jack Grasse, his enthusiasm, hard work, early morning monitoring and hearty sandwiches, the dormouse project would most probably not have succeeded. I hope than when I am Jack's age I will have his enthusiasm and love for what lies in my backyard. And have as many books!

PS We found 10 dormice on our final count of the year, the best year ever by far. Fingers crossed that all the habitat management is now paying off.

Wendy Joss is Conservation Manager for Forest Enterprise's Dolgellau Forest District.

Jack *a'r pathew*

Mae brwdfrydedd un dyn wedi cynorthwyo i adfer poblogaeth o bathewod, a ddarganfuwyd ym Mhantperthog, ger Cadair Idris yng Ngwynedd, nifer o flynyddoedd yn ôl. Cymerodd Jack Grasse ran mewn arolwg cenedlaethol a ddatgelodd fod pathewod yn goroesi yn yr hyn a oedd wedi troi yn blanhigfa o goed conwydd, gan fwydo ar gnau o'r llwyni cyll, a oedd ar un adeg yn wrychoedd fferm. Cytunodd Menter Coedwigaeth i gynllun cadwraeth brys i glirio'r coed conwydd o amgylch y coed cyll, a oedd yn marw wrth i'r conwydd daflu eu cysgod drostynt. Ond ni chynhyrchodd hyn yr amgylchiadau iawn i'r pathewod, oherwydd eu bod yn amharod i deithio unrhyw bellter dros dir agored. Mae tocio'r conwydd ar uchder y frest neu uwch wedi rhoi ateb, a gall coed wedi eu torri ddatblygu gorchudd trwchus yn fuan iawn i'r pathewod, yn ogystal â darparu planhigion, fel mieri a gwyddfid, yn fwyd iddynt. Mae Jack wedi cynorthwyo i sefydlu coedwig newydd o goed cyll, drwy drawsblannu i'r bylchau eginblanhigion cyll sy'n atgenhedlu yn lleol.

Mae goroesiad y pathew mewn planhigfeydd o goed conwydd wedi bod yn destun llawer o ddadlau. Mae awgrym y gallant fod yn bwydo ar bryfed fel gwyfynod yn y cynefinoedd hyn. Ers i flychau nythu gael eu gosod ym Mhantperthog saith mlynedd yn ôl, darganfuwyd niferoedd bach o bathewod ynddynt bob blwyddyn. Y llynedd darganfuwyd deg, y nifer uchaf erioed. Gall fod ymdrechion cadwraethol ac ymroddiad Jack Grasse yn dwyn ffrwyth.

The Freshwater Pearl Mussel in Wales – *a terminal decline?*

The Freshwater Pearl Mussel may have been the reason for the Roman expansion into North Wales. Once it was common in some rivers where it purified the water, doing the work which expensive water treatment plants do today, as well as keeping the rivers clean for the salmon and trout which form part of its extraordinary life cycle. Prized as a source of precious natural pearls it is now on the verge of extinction in Wales, thanks to past exploitation, and the engineering and pollution of rivers in recent times. ***Graham Oliver*** *charts this sad decline, and explains why we should attempt the difficult task of restoring freshwater pearl mussels to our rivers.*

The Freshwater Pearl Mussel, has been part of Welsh folklore for two millennia. The Romans were reputedly attracted into North Wales by the natural pearls it produces and these were still being fished for in the 1600s when the Lords of Gwydyr ran a commercial operation on the Afon Conwy [1]. At the same time pearl mussels were recorded from the Afon Tâf by George Owen of Henllys [1552-1613] [2, 3]. In the 1950s Scottish pearl fishers still visited rivers such as the Afon Tâf and R. Wye. Today, however, this species has full protection under our conservation legislation and all fishing for pearls is banned, a situation that is repeated throughout the European Union. What has happened, why, and can we or should we reverse this story of decline? Using Wales and the Marches as an example, this article summarises the status and conservation of the Freshwater Pearl Mussel and considers what actions are appropriate if its continued survival is to be assured.

The Freshwater Pearl Mussel *Margaritifera margaritifera*, along with all members of its exclusively freshwater family, has a bizarre life cycle where the larvae are parasitic and not free swimming. The larvae form cysts and develop in the gills of brown trout *Salmo trutta* or salmon *Salmo salar*. After over-wintering the minute juveniles drop off the fish host and are washed into the riverbed, where they live buried for some five years and must live for another ten before reaching sexual maturity. The sexes are separate and once mature, females produce 2-3 million larvae per year, which they hold in their gills before release. Perhaps most astounding is that individuals may live for another hundred years with a maximum age of 130 recorded from Scandinavia. This life cycle of high fecundity and great longevity is unusual among invertebrates in general and is believed to be an adaptation to counter the great loss of young experienced in the life cycle. The Freshwater Pearl Mussel prefers fast flowing rivers but the currents can carry off mussel sperm, larvae and juveniles and it is reckoned that 99.99% of eggs never develop to adulthood.

If the Pearl Mussel is to have a future, we need to understand the requirements of each stage of its life cycle, and not least the needs of the host fish without which the mussel could not survive.

The habitat of the Freshwater Pearl Mussel is typically that of fast flowing streams and rivers, rich in oxygen but poor in nutrients, mostly in upland regions. One can say that the streams and rivers of Snowdonia are ideal although large populations were once found in more base rich, nutrient rich, lowland conditions in rivers such as the Wye and Clun. Regardless of the water chemistry the mussels prefer riverbeds that are stable and consist of clean gravel or cobble/gravel/sand mixtures. They are often found in shallow riffle water partly buried in the gravel behind rocks and boulders but large beds occur in deeper water (1-2m) where the flow is moderate and the bed able to be penetrated by the mussel.

When conditions are right mussel beds can form with densities in excess of 500m^2 and millions of mussels can exist in a single river. Given the numbers taken this must have been the situation in the Afon Conwy when it was being fished in the 1600s.

An historic decline

Historical records suggest that the Freshwater Pearl Mussel was widespread throughout Wales and the Marches, and in numbers sufficient to entice pearl fishing on the Conwy, Dee, Teifi, Cleddau, Tâf, Wye and Clun.

From 1994 to date my department in partnership with the Countryside Council for Wales and the Environment Agency have conducted a series of surveys designed to establish the current population sizes, their age structure and to discuss possible causes for decline and subsequent conservation measures.

Figure 1 shows a map of Wales and the numbers of mussels actually observed during these surveys. These surveys focussed on historical sites but many kilometres of each river were explored and full data sets are to be found in a series of reports to the Countryside Council for Wales [4,5,6,7,8].

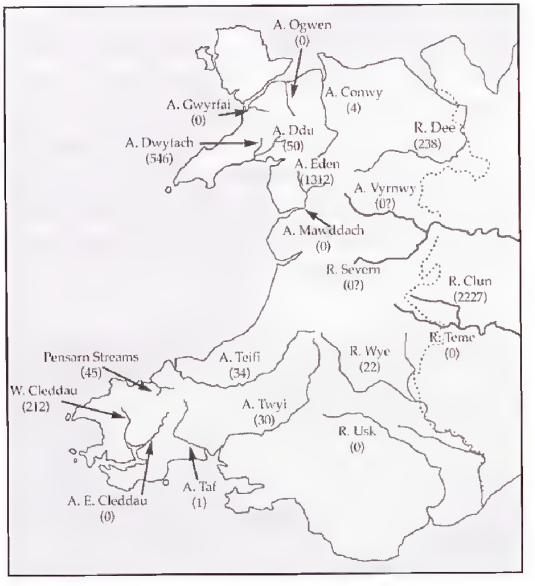


Figure 1

The surveys revealed that the numbers remaining were very low and that by comparison with data published in the 1980s [9,10] the decline had continued during the latter part of the 20th century. No mussels were found in some rivers previously known to hold them such as the Usk, Ogwen and Eastern Cleddau. In the Conwy and Tâf, both famous pearl fishing rivers, only four and one were found respectively. Nowhere were densities found approaching that of normal populations or were total numbers anywhere close to that of good quality rivers. Total population sizes in excess of a million mussels are reported for some rivers in Scotland and in excess of 10 million in rivers of the Russian Kola Peninsula, the last stronghold of this species in Europe [11].

Not only are the population sizes very low but the age structure indicates a more serious condition, lack of recruitment. In all rivers there are extremely few small mussels and in all but one, the Afon Eden, there are no mussels under 20mm in length which equates to at least 15 years in age. The conclusion is that in these rivers there has

been no recruitment for at least fifteen years and that for the Afon Eden the current rate of recruitment is lower than mortality. This state of recruitment being lower than adult mortality is termed 'functionally extinct' and means, that given no change, the populations will become extinct as the present adults die off. The great longevity of the mussel is the reason that extinction has not occurred more rapidly.

Causes for decline are numerous and complex. The most obvious is physical habitat destruction through drainage schemes, gravel extraction, flood prevention schemes and building work. This is now largely managed and controlled but the case of the Afon Ddu is a reminder of how widespread such destruction may have been. As recently as 1997 a population of mussels exceeding 5000 in number was extirpated by a land drainage operation on this small stream in Snowdonia [12]. This population was functional with many small mussels present and would also have been the largest in Wales. It was lost primarily because we did not know it was there!

Pearl fishing can be extremely destructive and the reckless mass killing recorded for the Conwy and the Irt in Cumbria was certainly enough to render the pearl fishing unprofitable. Once populations were reduced to this extent recovery was slow. We have no evidence that mussel numbers in the Conwy ever recovered but in the Irt there was also an early fishery, then another mid 1800 fishery, the latter from which that river never recovered.

The populations of the host fishes are important but real data is difficult to gather and interpret. Fisheries statistics show declines in the numbers of salmon in our rivers but the numbers of brown trout have little historic context. In order to sustain a large mussel population a large salmonid population is necessary; consequently any factors which reduce trout and salmon numbers also reduce mussel numbers.

Water chemistry has been extensively investigated and correlation with low adult numbers and adult mortality have been made with nitrate and phosphate levels [13]. These raised levels cause faster growth rates in adults with a resulting shortening of the life span. This lowers the number of spawnings and consequently fewer larvae are produced per female in a lifetime. With the very high mortality of the larvae it is apparent that not enough now survive to replace the dying adults. Nutrient increases also promote the primary production of algae and plankton (seston) in the river causing an increase in particulate organic matter. This settles onto the riverbed, especially in periods of reduced flow and can cause deoxygenation of the water in the gravel beds where the juveniles live. This process, known as eutrophication, is believed to be the prime cause of lack of recruitment [14].

The causes of eutrophication can be from point events such as organic pollution from factories but the largest sources of nutrients come from changes in agricultural practices on land in the catchments. Land use comparisons of two adjacent catchments in the Lake District, one supporting few mussels, the other many showed that in the catchment with few mussels there was a much higher proportion of arable and improved upland grassland. Most of the catchment of the river with many mussels was unimproved grassland and moorland [15].

Water flow can also be an important factor with the extremes of flood and drought both harmful to the mussel. Extreme floods can destroy mussel beds and drought can create low oxygen, increased siltation conditions for the juveniles.

Nature's water purifiers

This article has reviewed the population status and concluded that the pearl mussel in Wales is functionally extinct with perhaps the exception of the Afon Eden. A once famous part of Welsh nature is now on the verge of extinction in Wales. Should we try to conserve them here? As I have indicated millions live in Scotland, Scandinavia and Russia but here too they are in decline [11]. Given the wide range of this species how should conservation efforts be approached? There is one compelling factor that suggests that we cannot leave the conservation of this species to others and that is its role in maintaining river water purity.

The freshwater pearl mussel is a filter feeder and actively removes suspended matter from the river water. It has been estimated that a single adult mussel can filter 50 litres of water per day [16]. Similar activity of related unionid mussels in the R. Meuse, Belgium has been estimated to filter water equal to that of a purification station for a human community of 150,000 inhabitants [17]. The large beds of mussels in our rivers must have played an important part in purifying the water and could do so again if they could be re-established. Not only could this be beneficial to us but also to other parts of the river ecosystem. For example, gravel cleaning processes to encourage successful salmonid spawning might be unnecessary if the mussel beds still existed.

Species recovery programmes often use re-introduction either to build up low stock or to re-establish the species in its former range. Unfortunately for the pearl mussel those efforts that have been attempted so far have been unsuccessful and in any case could not be attempted until favourable conditions were restored. The reasons for this lack of success are not clear but it may be that each population is now genetically distinct or in some way acclimatised to its river. Initial work carried out in my department suggests that the southerly populations are genetically more diverse than the northern ones. This may relate to the post glacial history of the two sets of rivers in that those in southern Ireland and south Wales were not glaciated during the last ice age but those in Snowdonia and further north were. We cannot therefore assume that we can re-establish mussels in Wales by re-introducing them from other regions.

Thirdly there is the cultural dimension. Do we wish to lose a species that reputedly brought the Romans to Wales or entirely lose the option to consider pearl fishing ever again? Welsh gold is held in high esteem, the pearl is now lost.

The conservation of this species is complex both because of its life cycle and its river habitat. To establish favourable conditions will require a consensus of effort between all of those who use an entire river catchment. Small catchments should be simpler to manage and the proposed Special Area of Conservation (SAC) status of the Afon Eden reflects this but what a pity that we lost the Afon Ddu population because it would have been the easiest of all. The rivers Wye and Teifi also have SAC status but in these large rivers managing nutrient input, water flow, trout and salmon numbers may take many years to create favourable conditions.

Can we wait and should we perhaps invest in culture methods and the artificial maintenance of stocks until the selected rivers have recovered? Culture techniques have recently been developed in the Czech Republic and are widely deployed in the United States for many mussel species of their fauna. Mussels may not have the appeal of butterflies or birds but their key role in habitat maintenance surely warrants a much higher profile and level of care.

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Y fisglen berlog

Mae misglod perlog wedi bod yn rhan o chwedloniaeth Cymru ers dwy fil o flynyddoedd. Yn ôl y sôn roedd y Rhufeiniaid wedi eu denu i Ogledd Cymru gan y perlau naturiol y mae'r cregyn hyn yn eu cynhyrchu ac roedd pobl yn dal i bysgota am y rhain yn yr 1660au pan oedd Arglwyddi Gwydir yn cynnal menter fasnachol ar afon Conwy. Bellach maent bron iawn â bod wedi diflannu, ac nid oes unrhyw rai ifanc yn cael eu cynhyrchu.

Mae gan fisglod perlog gylch bywyd eithriadol. Mae'r larfau yn barasitig ac yn ffurfio pothelli yng nghegau eog a brithyll cyn treulio pum mlynedd wedi eu claddu yng ngraean afonydd sy'n llifo'n gyflym. Cymer ddeng mlynedd arall wedyn cyn y byddant yn barod i fridio. Gall unigolion fyw dros gan mlynedd, a chynhyrchu niferoedd enfawr o larfau. Ond ni wnaiff y rhain dyfu os yw'r amgylchiadau yn iawn. Mae'n rhaid i afonydd fod yn rhydd o lygredd a maethynnau, yn sefydlog, a rhaid iddynt fod â gwelyau o raean a digonedd o ocsigen ac eog a brithyll.

Mae gwelyau o fisglod perlog yn puro dŵr, ond cafodd gwelyau mawr eu difa amser maith yn ôl gan bysgota am berlau. Mae llygredd a newidiadau yng nghemeg dŵr, ac yn arbennig peirianneg afon, wedi cyfrannu at ddirywiad mawr. Deall eu cylch bywyd cymhleth a gofynion eu cynefin yw'r cam cyntaf yn y gwaith o arbed y rhywogaeth bwysig hon. Mae cynnydeb ynghylch rheoli dalgylchoedd bychain sydd â phoblogaethau ar ôl ynddynt o hyd, yn hanfodol os ydynt i gael eu harbed. Mae'n bosibl bod achos hyd yn oed dros gynnal stociau yn artiffisial hyd nes bo'r afonydd yn cael eu hadfer.

Puffin Island –
will removing rats bring back the puffins?

After habitat destruction, the damage caused by introduced species may pose the greatest threat to biodiversity, as well as costing £billions. Here ***John Ratcliffe*** *and* ***Wil Sandison*** *describe efforts to tackle just one example of a precious ecosystem under threat from biological invasion.*

It is estimated that the damage caused by alien species in the US runs to nearly £100 billion a year, while the rice farmers of the Philippines lose more than £30 million to the golden apple snail.

Invasion of the aliens

There is little publicity given to the damage caused worldwide by the introduction of invasive species to ecosystems that have few defences against them. While Japanese Knotweed and Giant Hogweed do sometimes make the headlines here, they are the tip of the iceberg, even in Britain. Around the globe, from New Zealand to North America to Lake Victoria in Central Africa, and on many islands in between, a battle is being waged against the invaders. Hard-pressed conservation agencies have to devote limited budgets to control alien species in order to save unique wildlife and ecosystems.

The economic cost is also stratospheric. It is estimated that the damage caused by alien species in the US runs to nearly £100 billion a year, while the rice farmers of the Philippines lose more than £30 million to the golden apple snail. The Nile perch has eliminated 200 endemic species of fish from Lake Victoria, while the brown tree snake has exterminated most of Guam's native forest birds. Other invaders on the global 'most wanted' list include the crazy ant, the water hyacinth, brown possum, zebra mussel, feral pigs and cats and rats. Here at home, we face American mink, grey squirrel and ruddy duck, Sika deer, Signal crayfish, Rhododendron, Australian swamp stonecrop and many other troublesome introductions, including, of course, the brown rat.

The brown rat *Rattus norvegicus* is probably the most ubiquitous companion of humans, and has spread from its origins in China to penetrate every continent. It arrived in Britain about 1720 (displacing the black rat *Rattus rattus* which had arrived from India some centuries earlier) and reaching Anglesey in 1762 where it is said to have eaten the corn while men were still reaping it. Rats colonised many offshore islands when light coastal shipping was the normal means of transport.

Puffin Island

Puffin Island or Ynys Seiriol is a 32 hectare carboniferous limestone island lying less than 1 kilometre off the eastern tip of Anglesey. It is a Site of Special Scientific Interest (SSSI), selected for its breeding cormorant colony, the largest in Britain with over 750 pairs. The island supports over 36% of the Welsh population of breeding cormorant. Other breeding seabirds include puffin, guillemot, razorbill, oystercatcher, shag, fulmar, kittiwake, herring gull, greater black backed gull and lesser black backed gull. In 1907 "at least 2000 puffins" were recorded on the island [1] but by the 1990s numbers had dwindled to less than 20 pairs. The flat top of the island has a large elder wood [2] and rank nitrogen-loving vegetation. Grey seals haul out at the eastern end of the island and some pups may be born there. Prior to the arrival of the brown rat the only other land mammal on the island was the rabbit, which disappeared with myxomatosis in 1955 [3].

The problem

The Puffin Island rats are reputed to originate from a shipwreck in 1816 and appear to have thrived in proximity to the breeding seabird colony, presumably on a diet of eggs, chicks, carrion and vegetation, particularly the roots of Alexanders (*Smyrnium olusatrum*). In 1971 a local pest control officer estimated there to be 500,000 rats with perhaps 250,000 burrows [4]. This may have been an overestimate but it indicates the perception of the problem.

The decline in puffin numbers (and absence of a number of other seabird species) cannot be directly attributed to the rat population as puffin colonies fluctuate for many reasons and can coexist with rats in some situations. However, experience from elsewhere indicates that diverse seabird colonies rarely thrive in the presence of rats and that the recovery of puffins and other species would be unlikely given a continuing high rat population.

The solution

A reconnaissance of the island was made by RSPB and CCW staff in February 1997 with Dr. Bernard Zonfrillo of the University of Glasgow whose recommendations guided the subsequent operation. A further reconnaissance was made in January 1998 to wedge chew sticks (wooden spatulas soaked in lard) to measure the distribution of rats on the island, revealing the widespread and active infestation.

As an important bird sanctuary there was concern at possible primary and secondary poisoning of birds. Warfarin was therefore the preferred poison because it has a very low toxicity to birds. With no history of use on the island, there was no possibility that rats had built up resistance. Finally, the rats retreat underground, reducing the availability of carrion for secondary poisoning.

In February 1998, CCW and the RSPB implemented the programme using 1 tonne of wholewheat treated with 0.05% warfarin. This was hauled in 25kg double bagged sacks up the cliff from the landing beach and stored under a tarpaulin. This apparently resulted in an unscheduled inspection from Customs and Excise officers the following night, investigating unusual activity on the island, who were surprised to find non-hallucinogenic drugs and gave us the benefit of the doubt!

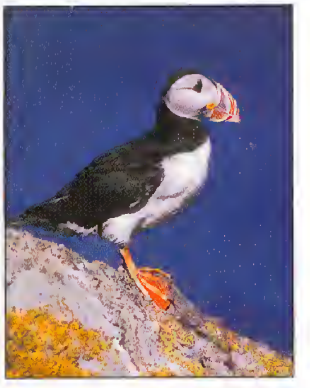
The poison was applied as 500 grammes of bait spooned down every accessible rat burrow and run, with teams of operators working in lines across the island. Care was taken to ensure that bait was not easily visible to seed eating passerine birds that frequent the island. Since boat access to the island is difficult and cannot be guaranteed to service a conventional re-baiting programme, overkill quantities were used in the knowledge that there were no other mammalian or human inhabitants to be affected.

The first day's operation consumed two thirds of the bait over about 20% of the island and showed that we had underestimated the number of burrows and the scale of the task. A further tonne of bait was airlifted to the island by RAF Seaking helicopter, enabling baiting operations to continue, and a final half tonne delivered later. All baiting was completed that day. Some six dead rats were recovered from burrow entrances, but most appeared to have died underground. Excavation of burrows with a spade revealed dead rats in every case. The application of bait took approximately 40 man-days.

Site visits since then have recorded no dead rats on the surface and no sign of recent activity. If one pregnant female rat survived, perhaps on a cliff ledge where bait could not be applied for safety reasons, this could in theory produce a population of 15,000 rats in one year. Further bait stations were laid in January 1999, particularly on the cliffs. For this operation, diphenocoum based "Neosorexa" 100gm pre-packed sachets were laid in plastic drainpipes. This bait was chosen as the total number of rats, if any, was known to be low and the chance of secondary poisoning considered very low. Although absence is a difficult thing to prove, as time passes with no sign of any rats, there is increasing hope that the island is rat-free.

The future

The most recent visit, in May 2001, found no evidence of rats and chew sticks had been left untouched. The vegetation has become luxuriant, especially the nettles, making those wearing shorts on the sunny day rue their decision. The rats may have been suppressing the vegetation. A count from a boat which circled the island found 24 puffins, an encouraging total.



The work has not ended and monitoring remains essential. The project has taken an estimated 150 man-days to date. There is no room for anything less than total eradication. Birds may take some years to respond to the situation. Among the species we hope to benefit are puffin, black guillemot and perhaps Manx shearwater and storm petrel. In 1997, the first Welsh record of breeding eider duck occurred on the island and two pairs were seen this year. There were also grey lag and Canada geese breeding, and a peregrine had a plucking post on the island.

Eradicating rats from islands has been successful in many places. Ailsa Craig and Handa Islands have been cleared in recent years. Closer to home Flatholm Island and Cardigan Island in South Wales were cleared of rats some years ago. The RSPB reserve of Ramsay Island is the latest island to be cleared.

Rat eradication is a speculative venture for conservation, an act of faith that a rat free island is more valuable than one with rats. Although the response of the birds is by no means guaranteed, we believe that where there are no other ground predators, opportunities to restore rat free conditions to islands should be pursued.

Acknowledgments

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Ynys Seiriol – *y llygod mawr a'r palod*

Daw un o'r bygythion mwyaf i fywyd gwyllt oddi wrth rywogaethau sy'n cael eu cyflwyno o'r newydd. Achosant ddifrod ecolegol ac economaidd enfawr o amgylch y byd. Yng Nghymru, wynebwn fygythiadau gan rywogaethau fel minc Americanaidd, y wiwer lwyd a'r llygoden fawr.

Mae'r llygoden fawr yn fygythiad arbennig i nythfeydd o adar môr. Sefydlodd llygod mawr ar Ynys Seiriol, yn ôl y sôn yn dilyn llongddrylliad ym 1816, a thyfodd y boblogaeth yn fawr iawn, a hynny mae'n debyg ar ddeiet o wyau a chywion adar môr, cyrff anifeiliaid marw a llystyfiant. Mae cylch o gyrff cadwraeth wedi llwyddo i glirio'r llygod mawr oddi ar Ynys Seiriol, ac ni ddarganfu'r arolwg diweddaraf ym Mai 2001 unrhyw dystiolaeth o lygod mawr ar yr ynys. Gwelwyd cyfanswm calonogol o 24 o balod, sy'n rheswm dros fod yn obeithiol y gallai'r palod un dydd ddychwelyd i'w niferoedd blaenorol ar Ynys Seiriol.

The freeing of a river – *restoring the Afon Ogwen*

Many of our rivers and their floodplains have been modified in the past, either to protect land and property from flooding or for land drainage. However, these modifications can seriously damage the landscape, amenity, wildlife and natural functions of a river.

***Bryan Jones** of the Environment Agency tells the story of the first phase of an ambitious river restoration scheme.*

In its upper reaches the Afon Ogwen is a high-energy mountain river. It flows through the Nant Ffrancon valley in the Snowdonia National Park and is part of the Glydeiriau Site of Special Scientific Interest (SSSI). The river is the main outflow from Llyn Ogwen, from which it flows northwards over Rhaedr Ogwen (Ogwen Falls) into a flat-bottomed U-shaped glacial valley 100m below. Downstream sediment transport is limited as upstream material is deposited in the lake.

In the 1960s the river in this area was dramatically changed in a general programme of works designed to improve the drainage of the floodplain farmland. The river was dredged using two draglines. Boulder riffles, cascades, fords and stepping stone obstacles were removed and used to create levees. As a result of these works, all in-stream and immediately adjacent riparian habitats were destroyed. This in turn badly affected the brown trout fishery, salmon recruitment and populations of in-stream plants and animals, including the rare freshwater pearl mussel *Margaritifera margaritifera*. The landscape value of the valley, which is internationally recognised for its glacial history, was severely impacted by piles of rubble on both banks. Subsequent drainage works carried out on the floodplain lowered the water table, which damaged the high-quality (SSSI) mire habitats and caused the loss of a large wintering population of whooper swan *Cygnus cygnus*.

In early 1997 a partnership was developed between the Environment Agency, the River Restoration Centre (RRC), the National Trust and the Countryside Council for Wales to promote a restoration project on the upper section of the river in the Nant Ffrancon valley. A 'vision' document was prepared which identified three river reaches for rehabilitation within a 4km section of the river valley floodplain area. This article describes the rehabilitation of the first of these reaches.

Objectives

- Restoration, as far as possible, of the channel, riparian and floodplain habitats and landscapes of the Nant Ffrancon valley to their pre-drainage state.
- Integration of channel, floodplain and agricultural management in such a way that farming activities are not unduly compromised by habitat restoration.

The first reach to be targeted for rehabilitation was a 990m length of river downstream of Rhaeadr Ogwen (Ogwen Falls). The river here was cutting down into the floodplain sediments and there was evidence of high rates of river bank erosion. Rehabilitation work started in summer 1998, with the Agency as the main funding partner.

Before rehabilitation could begin it was crucial that the National Trust (the landowner) and the other partners gained the co-operation of those tenants who would be affected by the works and ensured that farming operations would not be compromised. This was achieved by constructing a flood-flow model to predict the area and frequency of flooding following removal of levees and elevation of bed levels. The model predicted a significant increase in flooding on unimproved land throughout the year but, critically, very little change on two key improved fields in spring and summer.

The rehabilitation involved

- careful excavation to reveal the historic river banks;
- sorting debris on the river banks which had previously been dredged from the river channel and carefully returning it to the river to raise the bed level by an average of 1m (up to 2m in places);
- recreating boulder riffles, cascades, gravel features, stepping stones, islands and a ford in the river, according to historical records of their location.

The works on the river have been integrated into a wider habitat management plan for the floodplain. A key component of this plan is a series of measures to reduce erosion of the river banks and surrounding land. These include agreements between the Countryside Council for Wales, land tenants and the National Trust as landowner on the position of fencing relative to the river, hill slope drainage ditches, woodland regeneration and limiting stock access to the river banks.

Willow mattress revetment

Only materials from the immediate area were used in the rehabilitation, although willow from other local sources was used in a few places to create revetments to protect the river banks. The main benefits of using willow are its inherent flexibility which accommodates bank movements, its net-like roots which hold banks together and the wildlife and landscape value that living trees provide.

Restoring in-channel features

Boulder cascades, cobble riffles and islands forming a braided channel are characteristic natural features of high-energy mountain valley rivers. On the Ogwen they were removed in the past and used to create levees along the river. Although this provided some flood protection to adjacent fields it also caused flooding by blocking flood routes. In addition, it damaged the habitat quality of the river and its landscape value. The scheme sought to rectify this by restoring such features as close to their original position as possible.

A comprehensive set of surveys was carried out prior to rehabilitation and a programme of monitoring put in place afterwards to assess the success of the scheme.

Pre-scheme surveys and evaluations included:

- interested parties (landowner, owner-occupier, ongoing interests);
- ecology (vegetation, invertebrates, fish, water vole and riverside habitat);
- topography (floodplain and cross-sections of the channel);
- geomorphology (including flow patterns);
- hydrology (flood flow, flood modelling and predicted changes in flood routes and frequency of floods);
- history (map interpretation, local knowledge of historical changes to the site).

Lessons learnt

- Time spent on planning, design and pre-scheme surveys must be adequate to understand the unique character of the site. It is imperative that the reasons and processes that led to changes from the pre-impacted state are understood.
- Interested parties should be consulted fully to ensure that everyone is 'on board'. In this scheme the agreement of local farmers was central to the successful completion of the works. Use of flood-flow modelling was helpful in allowing the impact of the scheme on farming operations to be assessed at the design stage.
- It is best to leave at least 10 per cent of the project funding as a contingency to undertake refinements following a period of adjustment resulting from floods. It is far better not to over-engineer for caution but to allow natural river processes to help shape the final result within limits set by the design.
- Despite having environmental objectives, most river rehabilitation projects involve re-engineering which requires the skill and enthusiasm of a workforce knowledgeable of how 'their river' behaves. This project benefited from a workforce that was constantly advised by a river engineer who made final decisions based on site conditions and a flexible design.

- Suitable material for rehabilitation works is often available on site. In this project, the boulders and other material that had originally been dredged from the channel were stored and returned to the river in a discrete sequence to ensure they would achieve the desired features.Post scheme monitoring is ongoing and currently compises geomorphological audit, fish population surveys and analysis of flooding frequency. Experience of the risk of autumn floods demonstrated that, despite reducing channel capacity by 30 per cent, the rehabilitation scheme allowed floods to continue down the valley unhindered and improved the return of floodplain water to the channel when floods receded.

Although it is not yet possible to assess the long term benefits of this first phase of rehabilitation on the Ogwen, early signs are encouraging. The river has been restored to a more natural physical form and this should soon be reflected in the wildlife in and around the river. The success of the first phase of works will hopefully act as a catalyst to the rehabilitation of the other two reaches on the Afon Ogwen identified in the 'vision' document.

Bryan Jones is Conservation Team Leader at the Environment Agency.

Adfer Afon Ogwen

Mae llawer o'n hafonydd a'u gorlifdiroedd wedi eu newid yn y gorffennol, naill ai i warchod tir ac eiddo rhag llifogydd neu er mwyn draenio tir. Ond gall y newidiadau hyn amharu'n ddifrifol ar y dirwedd, ar fwynderau, bywyd gwyllt a swyddogaethau naturiol afon. Mae gwaith i adfer afon yn amcanu at ailgreu rhywfaint o'i chymeriad gwerthfawr drwy adfer rhan o'i ffurf ffisegol i'r cyflwr yr oedd ynddi cyn i newidiadau gael eu gwneud.

Dyma ddisgrifiad o gam cyntaf cynllun i adfer rhannau uchaf Afon Ogwen, afon fynyddig, fyrlymus sy'n llifo drwy Nant Ffrancon ym Mharc Cenedlaethol Eryri.

Yn yr 1960au cafodd yr afon yn yr ardal hon ei newid yn ddramatig mewn rhaglen gyffredinol o waith a gynlluniwyd i wella'r modd yr oedd ffermdir y gorlifdir yn cael ei ddraenio. Symudwyd rifflau clogfeini, rhaeadrau, rhydau a cherrig sarn, effeithiwyd ar y dirwedd gan bentyrrau o rwbel, a gwnaed niwed i anifeiliaid a phlanhigion. Effeithiwyd yn arw iawn ar frithyll ac eog, yn ogystal â'r fisglen berlog brin. Collwyd poblogaeth fawr o elyrch y gogledd oedd yma'n gaeafu.

Yn gynnar ym 1997 datblygwyd partneriaeth rhwng Asiantaeth yr Amgylchedd, y Ganolfan Adfer Afonydd, yr Ymddiriedolaeth Genedlaethol a Chyngor Cefn Gwlad Cymru i hyrwyddo prosiect adfer ar ran uchaf yr afon yn Nant Ffrancon. Roedd y gwaith adfer yn ymwneud â chloddio gofalus i ganfod glannau hanesyddol yr afon. Didolwyd cerrig ar lan yr afon a oedd wedi eu carthu'n flaenorol o sianel yr afon a'u dychwelyd yn ofalus i'r afon i godi lefel gwely'r afon o gyfartaledd o 1m (hyd at 2m mewn mannau). Ail-grewyd rifflau clogfeini, rhaeadrau, nodweddion graean, cerrig sarn, ynysoedd a rhyd yn yr afon, yn ôl cofnodion hanesyddol am eu lleoliad.

Dysgwyd llawer o wersi o'r profiad, gan gynnwys pwysigrwydd caniatáu digon o amser ar gyfer cynllunio. Mae'r canlyniadau yn galonogol. Adferwyd yr afon i ffurf ffisegol fwy naturiol a dylai hyn gael ei adlewyrchu'n fuan yn y bywyd gwyllt yn ac o amgylch yr afon. Gobeithir y bydd llwyddiant cam cyntaf y gwaith yn gweithredu fel catalydd i adfer dau ddarn arall o Afon Ogwen.

Llên y llysiau – *y wernen*

gan **Duncan Brown**

Enwau yn cynnwys (g)wern yw'r rhai mwyaf niferus o holl enwau lleoedd yng Nghymru sydd yn cyfeirio at goed er na fu'r wernen erioed y goeden fwyaf cyffredin yng Nghymru.

Map 1

Prosiect a gychwynnwyd gan Gymdeithas Edward Llwyd yw Llên y Llysiau i gofnodi pob math o gysylltiad rhwng pobl Cymru a phlanhigion. Mae'n ceisio casglu gwybodaeth am y rhywogaethau o dan nifer o benawdau, gan gynnwys tarddiad yr enw, cyfeiriadau llenyddol, enwau lleoedd, cofnodion hanesyddol, a'r defnydd o'r planhigion. Y bwriad yw cyhoeddi'r wybodaeth yn ei chrynswth yn y pen draw. Yn y cyfamser cyflwynir gwybodaeth am wahanol blanhigion mewn nifer o gylchgronnau, a thrwy ffynonellau eraill, i annog darllenwyr i ychwanegu at yr ysgrifau o'u profiad eu hunain. Bydd yr wybodaeth hefyd ar gael ar safle we'r Gymdeithas sy'n cael ei datblygu ar hyn o bryd. Os oes gennych unrhyw beth i'w ychwanegu at y manylion isod, cysylltwch a Duncan Brown (rhif ffôn: 01286 650547 neu e-bost: dbrown.waunfawr@virgin.net).

Enw safonol Cymraeg

gwernen (b.), gwern

Enw Lladin

Alnus glutinosa

Enwau Cymraeg eraill

Coed clocs, blodau: cynffonau wyn bach, ffrwyth moch coed bach

Tarddiad yr enw(au) ac enwau cytras

Yn yr ieithoedd Celtaidd eraill, yn ogystal a golygu'r goeden, gall y geiriau sy'n cyfateb i gwern hefyd olygu 'hwylbren', 'polyn' neu 'trawst'.

Cyfeiriadau llenyddol

Helygen dan benglogau – o farrug
Ar fore'r angladdau;
Gwern a brwyn yn esgyrn brau,
A'r bedw'n ysgerbydau

Geraint Lloyd Owen

Enwau lleoedd

Nid oes sicrwydd ymhob achos p'un ai at a) goedwig o wern, b) lle corsiog, ynteu c) lle y tyfai gwern arno ar un adeg, y cyfeiria'r enwau hyn atynt heddiw, ond yn sicr, y cyntaf fyddai'r ystyr yn wreiddiol.

Gweler y map am ddosbarthiad yr enwau sydd yn cynnwys yr elfen – wern – yng Nghymru (*Map 1*). Maent i'w gweld ar draws Cymru ac eithrio de Penfro ond maent yn fwy niferus (yn annisgwyl efallai) ar hyd gororau'r gogledd a'r de. Ai oherwydd galw mwy sylweddol am gynnyrch y wernen dros y ffin yw hyn?

Dim ond yr enwau sydd ar y mapiau OS 1:10000 a ddangosir ar *Map 1*. Mae llawer iawn o enwau yn cynnwys gwern wedi eu cofnodi mewn mannau eraill. Dyma'r rhai sydd yn ymddangos yng nghyfrifiad 1851 o Abergwyngregyn er enghraifft:

Gwern Engan
Pen y Wern
Wern y Pandy
Wern Goch

Defnyddiwyd coed gwern i wneud golosg. Dyma enwau sydd yn cyfeirio at gynhyrchu golosg:

Cwm y Glo (Arfon)
Y Coed Duon (Gwent)

Enwau yn cynnwys (g)wern yw'r rhai mwyaf niferus o holl enwau lleoedd yng Nghymru sydd yn cyfeirio at goed er na fu'r wernen erioed y goeden fwyaf cyffredin yng Nghymru.

Arferion plant

Nododd Grigson mai whistlewood oedd yr enwau Saesneg am y wernen ond y fasarnen a ddefnyddiwyd i wneud chwibanau pren yn y Waunfawr ym 50au'r ganrif ddiwethaf.

Cofiannau lleol

Soniodd Mrs Mary Vaughan Jones am weld yn ei phlentyndod, tua diwedd y Rhyfel Cyntaf pan aeth i fyw gyntaf i Blas Glanrafon, Waunfawr, 'pren cochlyd' y bonion gwern' ar ôl i'r llifwyr eu torri ar gyfer gwneud gwadnau clocsiau. Ni chafodd y coed eu trin i'r perwyl hwn yn y fan a'r lle, ond gwerthodd ei thad hwy 'am rhyw boced bach' i un o'r enw Richard Price. Gadawyd 'llanast mawr ar eu holau'! Cymry o Lanrwst oedd y llifwyr.

Llên gwerin

Gwern oedd fab i Matholwch a Branwen yn y Mabinogion.

Pengwern – y rhan o'r hen Bowys a oresgynwyd gan y Sacsoniaid

gwynt o'r hen Bengwern = gwynt y dwyrain yn dod ag oerfel y gaeaf (Maldwyn)

Beth yw'r cysylltiad rhwng Gwern fel enw person a gwern fel enw coeden?

Ai engraifft o drosglwyddo cymeriad o fyd natur i berson yw hyn, megis yn yr enghraifft o Bleddyn a blaidd?

Mae'r wernen yn goeden anlwcus i'r Gwyddelod, sy'n casau ei gweld yn cael ei thocio gan ei bod yn torri'n wyn, ac wedyn yn troi'n lliw gwaed.

Bwyd

Nid ystyrir dail gwern o werth i anifeiliaid gan fod cymaint o asid tannin chwerw ynddynt.

Defnydd

alders have been planted, as willows sometimes are, [to]...strengthen the banks of streams and help them resist erosion (Edlin 1949, Woodland crafts in Britain, London, Batsford)

Dyma rai o'r ffyrdd y defnyddiwyd y wernen a'r hyn a gredwyd amdani:

coed tân gwael; para yn dda mewn dŵr; un o'r coed gorau i wneud powdwr saethu; staen coch deniadol arni o'i rhoi mewn mawn; cafodd ei galw'n Scots mahogany i wneud dodrefn; gwnaed pennau brwsh ohoni; ar ôl eu torri cafodd y rhisgl ei sgorio i helpu aeddfedu'r pren; hwn oedd yr hoff bren i wneud hat-blocks am ei fod yn feddal ac yn hawdd i'w droi i siapiau gwahanol; defnyddiwyd y rhisgl i drin lledr (Edlin 1949).

Yn draddodiadol ystyrir pren y wernen yn addas at gael ei droi i ffurfio gwrthrychau cywrain, i wneud pennau brwsh, gwadnau clocsiau, golosg (yn enwedig ar gyfer powdwr saethu) ac unrhyw ddefnydd ohono lle mae gofyn am bren nad yw'n pydru mewn dŵr. Yn y Wern Fudr a'r Wern Goch (yng Gwarchodfa Natur Coedydd Aber, ger Llanfairfechan) daeth y bondocio ar gyfer cael pren i wneud clocsiau i ben tua 1940. Ceir sôn am weithgarwch trin clocsiau yn ardal Llanerchymedd.

Roedd y gwneuthurwyr gwadnau clocsiau yn gweithio mewn giangiau o 20 neu fwy gan symud o un ystad i'r llall pan oedd y coed copi yn barod i'w torri *The north of England was naturally their stronghold but they travelled up most of the valleys of Wales ...where the alder grows...often they lived rough, sleeping out in the woods in tent-shaped cabins made of branchwood, roofed with turf...a few are still at work on Anglesey.* (Edlin 1949)

Cafodd coed gwern eu torri a'u cynaeafu gan fyneich Abaty Maenan yn ardal Gwern yr Ardda, Dolgarrog yn y canol oesoedd.

Mae cynffonnau wyn bach, brigau a rhisgl y wernen yn rhoi lliw du a ddefnyddid gan liwyddion tlawd i lifo defnydd bras, capiau, 'sanau a phethau tebyg.

Defnyddiwyd hi i wneud pibelli dŵr a phympiau, a pholion o dan dai a phontydd. Mae llawer iawn o adeiladau Fenis yn gorffwys ar wern.

Hoff bren y chwilen ddodrefn yw'r wernen a defnyddid darnau ohoni mewn tai i'w denu. Credir ei bod hi'n bosibl amddiffyn holl goed eraill y tŷ trwy losgi'r abwyd yn ystod Ebrill a Mai cyn i'r cynrhon droi'n chwilod a chwilio am borfeydd newydd.

Meddyginiaethau

RHAG Y CLEFRI NEU'R DDARWYDEN FAWR

Cymmer fadarch, a lle bo ffwng y ddaear a elwir bwyd llyffaint, a'r dail cochion a fydd ar y gwern, ag ymenyn puredig, a berw ynghyd mewn llaethdefaid, ac yna hidlo trwy lliaincrai, ag yn fynych iro hwn, ag iach y byddi gyda Duw. Meddygon Myddfai

Ystyriaethau ecolegol

Y mae'r wernen yn cadeirio yn rhwydd iawn o'i thocio yn ei bôn. Trwy hynny bydd coeden yn parhau am gyfnod amhenodol lle na fuasai wedi byw yn hwy na 120 o flynyddoedd heb ei thocio. Ystyrir unrhyw fesur o goed gwern nad oes mathau o goed eraill yno o gwbl yn ganlyniad i weithgaredd dyn. Wrth iddynt ail dyfu, gall y cadeiriau dorri'n rhydd o'r mam-fonyn a thyfu ar wahân. Awgryma rhai i'r cadeiriau hyn dyfu'n gylch o gwmpas y bonyn gwreiddiol diflanedig, gyda maint y cylch yn fesur o oedran y goeden.

Hanes

Yng nghyfreithiau Hywel Dda mae pob coeden nad yw'n cynhyrchu ffrwythau (ac eithrio'r ywen ond yn cynnwys onnen, gwern a helyg) yn werth pedair ceiniog.

Llên y Llysiau *(the Lore of Plants)*

... is a project initiated by Cymdeithas Edward Llwyd to collect information on the cultural connections of plants in Wales and to celebrate them. These connections include literary references, origins, place names, historical references and the uses of plants. In the early stages of the project the data is collected in a systematic way as in the above example of alder. If you have any anecdotes about plants or factual contributions which would add to our stock of information, the project group would like to hear about them.

Assembly *Notebook*

***Michelle Hunt** reports on Assembly business affecting wildlife and the countryside.*

Since Devolution in 1999, the National Assembly has brought the environment and wildlife conservation to the forefront of the political agenda in Wales. Devolution has dramatically altered the way that the environmental sector operates and provided the people of Wales with improved mechanisms with which to voice their concerns through the Assembly, and therefore help mould future policy and legislation affecting Wales.

Within the last year alone, there have been many examples of the impact of the Assembly's decision-making process upon nature conservation in Wales. These include the Assembly's involvement in the consultation and designation of Special Areas of Conservation under the Natura 2000 network and as part of the EC Habitats Directive and ensuring there is a system where important habitats are protected from inappropriate development through the Planning call-in procedure and the decision committee.

One of the most sensitive issues that has come before the National Assembly in the last year concerns genetically modified organisms. In October the Assembly decided not to approve the ***Seeds (National List of Varieties) 2000 regulations*** because they listed a genetically modified seed, Chardon LL. The order, which England, Scotland and Northern Ireland had already approved, was defeated by 42 votes to 10.

In his statement in Plenary, Carwyn Jones stated "I will make it clear to the DETR that the Assembly will not support any further farm-scale trials of GM crops in Wales. I make a commitment to seriously consider all possible grounds for refusing the listing of Chardon LL. I will also set up a start and finish all-party task group to consider how we take things forward." [1]

Although it transpired that the Assembly did not have the powers to resist a GM trial from going ahead in Sealand, Flintshire, Carwyn Jones brought forward statutory separation distances between GM and organic crops in an attempt to safeguard organic production from cross pollination.

Within the last six months, the Environment, Planning and Transport Committee have implemented the ***Countryside and Rights of Way Act 2000 in Wales***. The Act, which is the first major piece of wildlife and countryside legislation for nearly 20 years includes better protection and conservation of wildlife and Sites of Special Scientific Interest under Part III. Specifically it:

- places the Assembly under a duty to have regard to biodiversity conservation in exercising its functions.
- improves the procedures for notification and de-notification of SSSIs
- includes measures to secure better management of SSSIs (alongside new rights of appeal for affected landowners
- increases the penalties for damage to SSSIs and for wildlife crime.
- sets stronger penalties

The Assembly's budget provides for the implementation of the whole CROW Act provisions, and this includes an extra £1.2 million for CCW, an estimated £360,000 for the three National Parks and £2.4 million for the local authorities, allowing for improvements to the rights of way network in relation to the new SSSI procedures. [2]

The review of ***Assembly Sponsored Public Bodies (ASPBs) including the Quinqennial Review of CCW*** was identified as a priority piece of work for the Environment, Planning and Transport committee last November and is currently underway. Now that public consultation has taken place, the Assembly will consider the future role of CCW, how best it should deliver its services and functions and whether any improvements are needed to increase its efficiency.

The Assembly have been working closely with statutory agencies such as the Environment Agency, for example on the ***Water Resources Strategy for Wales***, bringing valuable substance to the Assembly's sustainable development scheme. The Assembly is working together with the Environment Agency, Ofwat, central government and the water industry to ensure improvements in water efficiency and conservation.

The publication of the UK Millennium Biodiversity report on March 26th 2001 will help the Assembly develop a true Welsh approach to implementing the UK Biodiversity Action Plan and honouring the commitment made by the UK Government at Rio in 1992. The conclusions and recommendations in ***Sustaining the Variety of Life: 5 Years of the UK Biodiversity Action Plan*** will be used to inform Assembly policy making in this area. Prepared by the UK Biodiversity Group and delivered to all the devolved administrations, this report looks at five years of action for biodiversity and assesses progress on the 436 Action Plans for the most threatened habitats and species in the UK. Of those 221 are relevant to Wales.

The report emphasises five continuing challenges:

- Action planning is not enough, there must be effective delivery on the ground;
- More effort is needed to make sure that biodiversity conservation enters into the mainstream policies and practices of all sectors of society
- More Local Biodiversity Action Plans must be developed and put into practice;
- Internet technology must be used to the full to develop comprehensive data sources and help all those involved exchange information;
- Biodiversity conservation ideas should not stand still – they should respond to new knowledge and changing pressures such as climate change.

The report also proposes the establishment of a broader UK Biodiversity Partnership to reflect the situation under devolution, where the devolved administrations have responsibility for many biodiversity related activities. The Environment, Planning and Transport Committee are due to discuss this in November. [3]

The report can be viewed on the website www.ukbap.org.uk

Public consultation on the implementation of the EC Water Framework Directive (2000/60/EC) finishes at the end of June, with a three-year timetable for implementation. The Agriculture and Rural Affairs Committee will be discussing the future of farming in Wales in the aftermath of foot and mouth disease in the coming months, as well as agri-environment schemes and diversification. The Environment, Planning and Transport Committee will be discussing CROW regulations and Biodiversity in the light of the UKMBR.

References

1 Carwyn Jones statement made in Plenary 19/10/00
2 Adapted from EPT 03-01 (p.3) Committee paper 14/02/01
3 From NAW Press Release 26/03/01

Michelle Hunt is the National Assembly Information Officer for Wales Wildlife and Countryside Link. This post has been funded by members of Wildlife Link to keep subscribing members up-to-date with all aspects of National Assembly Business that impact on, or address the concerns of the environmental organisations working in Wales.

Nodiadau o'r **Cynulliad**

***Michelle Hunt** yn rhoi adroddiad ar waith y Cynulliad sy'n effeithio ar fywyd gwyllt a chefn gwlad*

Er datganoli ym 1999, mae'r Cynulliad Cenedlaethol wedi dod â'r amgylchedd a gwarchod bywyd gwyllt i flaen yr agenda wleidyddol yng Nghymru. Mae datganoli wedi newid y ffordd y mae'r sector amgylcheddol yn gweithredu yn aruthrol ac wedi rhoi gwell mecaniaeth i bobl Cymru leisio eu pryderon drwy'r Cynulliad, ac felly wedi cynorthwyo i fowldio polisi a deddfwriaeth yn y dyfodol sy'n effeithio ar Gymru.

O fewn y flwyddyn ddiwethaf yn unig, cafwyd llawer o enghreifftiau o effaith proses llunio penderfyniadau'r Cynulliad ar warchod natur yng Nghymru. Mae'r rhain yn cynnwys cyfranogiad y Cynulliad yn y gwaith o ymgynghori a dynodi Ardaloedd Cadwraeth Arbennig o dan Rwydwaith Natura 2000 ac fel rhan o Orchymyn y GE a sicrhau bod system yn bodoli lle mae cynefinoedd pwysig yn cael eu gwarchod rhag datblygiad amhriodol drwy'r weithdrefn Cynllunio 'galw i mewn' a'r pwyllgor penderfynu.

Mae un o'r materion mwyaf sensitif a ddaeth o flaen y Cynulliad Cenedlaethol yn y flwyddyn ddiwethaf yn ymwneud ag organebau wedi eu newid yn enynnol. Ym mis Hydref, penderfynodd y Cynulliad beidio â chymeradwyo ***Rheoliadau Hadau (Rhestr Genedlaethol o Amrywiaethau) 2000*** oherwydd ei fod yn rhestru had wedi ei newid yn enynnol, Chardon LL. Cafodd y rheoliadau, yr oedd Lloegr, yr Alban a Gogledd Iwerddon eisoes wedi ei gymeradwyo, ei wrthod o 42 pleidlais i 10.

Yn ei ddatganiad yn y Sesiwn Lawn nododd Carwyn Jones: "Byddaf yn ei gwneud yn eglur i AACRh na fydd y Cynulliad yn cefnogi unrhyw dreialon pellach ar raddfa ffermydd o gnydau GM yng Nghymru. Rwy'n gwneud ymrwymiad i ystyried yn ddifrifol pob rheswm posibl dros wrthod rhestru Chardon LL. Byddaf hefyd yn sefydlu grŵp tasg yn cynnwys aelodau o bob plaid i ymdrin â'r mater o'r dechrau i'r diwedd i ystyried sut y gallwn fynd â phethau yn eu blaenau..." [1] Er y daeth yn amlwg yn gynharach y mis hwn nad oedd gan y Cynulliad bwerau i wrthod treial GM rhag mynd rhagddo yn Sealand, Sir y Fflint, cyflwynodd Carwyn Jones bellterau statudol rhwng cnydau GM a chnydau organig mewn ymdrech i ddiogelu cynnyrch organig rhag croes-beillio.

O fewn y chwe mis diwethaf, mae Pwyllgor yr Amgylchedd, Cynllunio a Chludiant wedi gweithredu ***Deddf Cefn Gwlad a Hawliau Tramwy 2000 yng Nghymru***. Mae'r Ddeddf, sef y darn mawr cyntaf o ddeddfwriaeth bywyd gwyllt a chefn gwlad ers bron i ugain mlynedd yn cynnwys gwell gwarchodaeth a chadwraeth i fywyd gwyllt a Safleoedd o Ddiddordeb Gwyddonol Arbennig o dan Ran III. Yn benodol mae:

- yn gosod y Cynulliad o dan ddyletswydd i roi ystyriaeth i warchod bywyd gwyllt wrth ymarfer ei swyddogaethau;
- yn gwella'r gweithdrefnau ar gyfer hysbysu a dad-hysbysu SoDdGA;
- yn cynnwys mesurau i sicrhau gwell rheolaeth ar SoDdGA (ynghyd â hawliau apêl newydd ar gyfer tirfeddianwyr yr effeithir arnynt;
- yn codi'r cosbau am ddifrod i SoDdGA ac am droseddau yn ymwneud â bywyd gwyllt;
- yn gosod cosbau cryfach.

Mae cyllideb y Cynulliad yn darparu ar gyfer gweithredu holl ddarpariaethau'r Ddeddf Cefn Gwlad a Hawliau Tramwy, ac mae hyn yn cynnwys £1.2 miliwn ychwanegol ar gyfer CCGC, amcangyfrif o £360,000 ar gyfer y tri Pharc Cenedlaethol a £2.4 miliwn i'r awdurdodau lleol, gan ganiatáu ar gyfer gwelliannau i rwydwaith y llwybrau cyhoeddus mewn perthynas â gweithdrefnau SoDdGA newydd. [2]

Nodwyd yr arolwg o Gyrff Cyhoeddus a Noddir gan y Cynulliad, gan gynnwys yr Arolwg Pum Mlynedd o GCGC fel darn o waith y rhoddir blaenoriaeth iddo gan Bwyllgor yr Amgylchedd, Cynllunio a Chludiant fis Tachwedd diwethaf ac mae ar y gweill ar hyn o bryd. Gan fod ymgynghoriad cyhoeddus bellach wedi digwydd, bydd y Cynulliad yn ystyried rôl CCGC yn y dyfodol, sut y dylai gyflwyno ei wasanaethau a'i swyddogaethau yn y dull gorau ac a oes angen unrhyw newidiadau i wella ei effeithiolrwydd.

Mae'r Cynulliad wedi bod yn gweithio'n agos gydag asiantaethau statudol fel Asiantaeth yr Amgylchedd, er enghraifft ynglŷn â Strategaeth Adnoddau Dŵr i Gymru, gan ddod â sylwedd gwerthfawr i gynllun datblygiad cynaliadwy y Cynulliad. Mae'r Cynulliad yn gweithio gydag Asiantaeth yr Amgylchedd, Ofwat, y Ilywodraeth ganolog a'r diwydiant dŵr i sicrhau gwelliannau mewn effeithiolrwydd dŵr a chadwraeth.

Bydd cyhoeddi adroddiad Bioamrywiaeth y Mileniwm y DG ar Fawrth 26 2001 yn cynorthwyo'r Cynulliad i ddatblygu agwedd wirioneddol Gymreig at weithredu Cynllun Gweithredu Bioamrywiaeth y DG a chadarnhau'r ymrwymiad a wnaed gan Lywodraeth y DG yn Rio ym 1992. Defnyddir y casgliadau a'r argymhellion yn Cynnal Amrywiaeth Bywyd: Pum Mlynedd o Gynllun Gweithredu Bioamrywiaeth y DG i fod yn sail ar gyfer llunio polisi gan y Cynulliad yn y maes hwn. Mae'r adroddiad hwn a baratowyd gan Grŵp Bioamrywiaeth y DG ac a gyflwynwyd i'r holl weinyddiaethau wedi eu datganoli, yn edrych ar bum mlynedd o weithredu ar gyfer bioamrywiaeth ac yn mesur cynnydd ynghylch 436 o Gynlluniau Gweithredu ar gyfer y cynefinoedd a'r rhywogaethau sydd o dan y bygythiad mwyaf yn y DG. O blith y rhain mae 221 yn berthnasol i Gymru.

Mae'r adroddiad yn pwysleisio pump sialens sy'n parhau:

- Nid yw cynllunio sut i weithredu yn ddigon, rhaid gweithredu yn effeithiol ar lawr gwlad;
- Mae angen mwy o ymdrech i sicrhau bod gwarchod bioamrywiaeth yn cael ei gynnwys o fewn polisïau yn y prif ffrwd ac arferion holl sectorau cymdeithas;
- Rhaid datblygu mwy o Gynlluniau Gweithredu Bioamrywiaeth Lleol a'u rhoi ar waith;
- Rhaid defnyddio technoleg y Rhyngrwyd yn llawn i ddatblygu ffynonellau data cynhwysfawr a chynorthwyo'r holl rai hynny sy'n ymwneud â chyfnewid data;
- Ni ddylai syniadau ynghylch gwarchod bioamrywiaeth aros yn eu hunfan – dylent ymateb i wybodaeth newydd a phwysau sy'n newid megis newid yn yr hinsawdd.

Mae'r adroddiad hefyd yn argymell sefydlu Partneriaeth Bioamrywiaeth ehangach i'r DG i adlewyrchu'r sefyllfa o dan ddatganoli, lle mae gan y gweinyddiaethau sydd wedi datganoli gyfrifoldeb am lawer o weithgareddau sy'n gysylltiedig â bioamrywiaeth. Mae Pwyllgor yr Amgylchedd, Cynllunio a Chludiant i fod i drafod hyn ym mis Tachwedd. [3]

Gellir gweld yr adroddiad ar y wefan www.ukbap.org.uk

Daw ymgynghoriad cyhoeddus ynghylch gweithredu Gorchymyn Fframwaith Dŵr y GE (2000/60/y GE) i ben yn niwedd Mehefin, gydag amserlen tair blynedd ar gyfer gweithredu. Bydd y Pwyllgor Amaeth a Materion Gwledig yn trafod dyfodol ffermio yng Nghymru yng nghysgod clwy'r traed a'r genau yn y misoedd i ddod, yn ogystal â chynlluniau amaeth-amgylchedd ac arallgyfeirio. Bydd Pwyllgor yr Amgylchedd, Cynllunio a Chludiant yn trafod rheoliadau'r ddeddf Cefn Gwlad a Hawliau Tramwy a Bioamrywiaeth yng ngoleuni UKMBR.

Cyfeiriadau

1 Datganiad Carwyn Jones a wnaed yn Sesiwn Lawn y Cynulliad 19/10/00

2 Addaswyd o EPT 03-01(t.3) Papur Pwyllgor 14/02/01

3 O Ddatganiad i'r Wasg CCC 26/03/01

Mae **Michelle Hunt** yn Swyddog Gwybodaeth yn y Cynulliad Cenedlaethol dros Cyswllt Bywyd Gwyllt a Chefn Gwlad. Ariannwyd y swydd hon gan aelodau o Gyswllt Bywyd Gwyllt er mwyn cadw aelodau sy'n tanysgrifio mewn cysylltiad â holl agweddau busnes y Cynulliad Cenedlaethol sy'n effeithio ar, neu sy'n ymdrin â phryderon cyrff amgylcheddol sy'n gweithio yng Nghymru.

Biodiversity *Round-up*

Local Biodiversity Action Plans

The conservation of nature, or biodiversity, as it is increasingly known, is a shared activity. The fortunes of nature depend on the efforts of individuals, farmers and land managers, voluntary and statutory agencies, businesses and politicians across the spectrum.

It is a measure of the political support which now exists for nature conservation that the Minister for the Environment, Sue Essex, helped launch in 2000 two new Plans for the conservation of biodiversity, one for Pembrokeshire and one for Carmarthenshire. In addition to published Plans like these, there are others in preparation covering the whole of the country. They connect the bold concepts behind the UK Biodiversity Action Plan with the needs of local wildlife and the skills, knowledge and commitment of local people. Behind the preparation of local plans, a huge step forward in itself, there is a story of local initiatives and conservation projects which is not always heard.

Each Plan addresses the needs of local wildlife through a series of individual species and habitat plans which recommend action. The success of the Plans will depend on the practical steps which are taken to deliver the actions, for example through added protection for sites of local importance for wildlife.

Ultimately the conservation of nature is a site-based activity. Real conservation takes place on farms, in woods, on mountains and moors, sand dunes and grazing marshes, the local common, the lane with its hedgerows and the park with its trees. It is an activity which depends, not on a small elite, but on all those whose decisions affect these sites. Some are politicians in a big way but most are politicians operating locally in their capacity as site managers, landowners and as their advisors. We hope to report on some good news stories about local biodiversity in the next edition. Here Julia Korn provides some diary entries for her first few months as Local Biodiversity Action Plan (LBAP) facilitator.

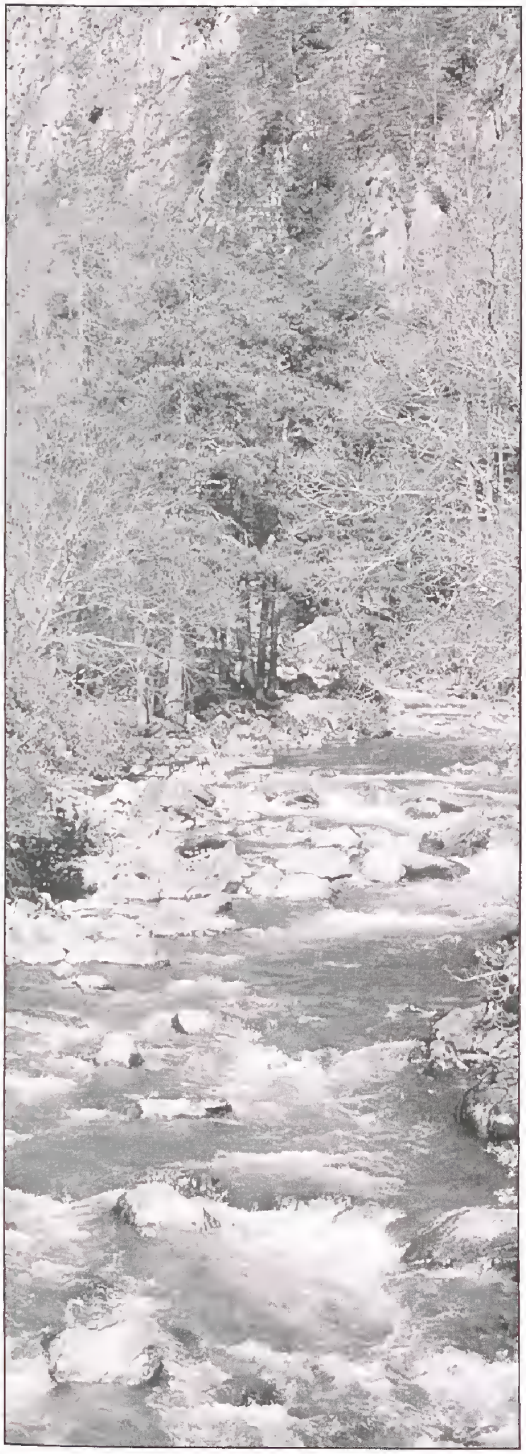
March

Launch in London of the UK Biodiversity Group's 'Millennium Biodiversity Report'. It is available on the web at www.ukbap.org.uk. It sets the agenda for the Country Groups to take forward the UK BAP, spells out new partnerships working at UK level and between UK species and habitat groups and the L BAP groups.

Am meeting lots of new people and contacting many more through the never-ending e-mail system. When I get out it's great to put names to faces and discuss matters over a cup of tea rather than a computer keyboard. There is so much work going on to conserve biodiversity and so much enthusiasm; it is important to harness this and use it to push for increased support from those in high places.

April

Monitoring and reporting are emerging as priorities alongside funding LBAP work and Local Record Centres. I attended a Bristol meeting on the former and came away a little clearer but even more daunted by this issue.



Wales Biodiversity Group

meets at the National Library in Aberystwyth on a beautiful sunny day. This meeting was an interesting insight into how issues I have discussed endlessly at a more grass root level are addressed at a higher level.

Local Issues Advisory Group (LIAG)

Practitioners'seminar – an excellent opportunity to meet more of the people involved in biodiversity action. In a moment of madness, I agreed to report back to the whole seminar on our morning workshop!

May

English Local Issues Group (LIG) seminar in Bristol. An excellent affair with very informative talks in the morning on progress of LBAP in England, the Millennium Biodiversity Report and reporting. England, Wales and Scotland all have posts to support the L BAP process. Back in Wales I continue to attend LBAP group meetings and start to develop targets such as producing best practice notes for general distribution.

Distributed a second news sheet. The circulation of the first one was mainly just to the LBAP contacts but it appears to be popular and now I have a huge mailing list. The workload is fairly high now, I have to prioritise projects which is difficult when many aspects appear equally important. I hope to develop clear targets over the next few months so that I can monitor progress – maybe I should write an action plan for myself?

Julia Korn started work in February as Local Biodiversity Action Plan (LBAP) facilitator, employed by the Wales Biodiversity Group.

Newyddion **Bioamrywiaeth**

Cynlluniau Gweithredu Bioamrywiaeth Lleol

Mae gwarchod natur neu fioamrywiaeth, fel y gelwir ef yn gynyddol, yn weithgaredd a rennir. Mae tynged natur yn dibynnu ar ymdrechion unigolion, ffermwyr a rheolwyr tir, asiantaethau gwirfoddol a statudol, busnesau a gwleidyddion ar draws y sbectrwm.

Mae'n arwydd o'r gefnogaeth wleidyddol sydd bellach yn bodoli i warchod natur fod y Gweinidog dros yr Amgylchedd, Sue Essex, wedi cynorthwyo i lansio dau Gynllun newydd yn 2000 ar gyfer gwarchod bioamrywiaeth, un i Sir Benfro ac un i Sir Gaerfyrddin. Yn ychwanegol at gynlluniau a gyhoeddwyd fel y rhain, y mae eraill sy'n cael eu paratoi ar gyfer y Sir gyfan. Maent yn cysylltu'r cysyniadau beiddgar sydd y tu ôl i Gynllun Gweithredu Bioamrywiaeth y DG ag anghenion bywyd gwyllt a sgiliau, gwybodaeth ac ymrwymiad pobl leol. Y tu ôl i baratoi cynlluniau lleol, cam enfawr ynddo'i hun, mae stori am brosiectau cadwraeth nad yw bob amser yn hysbys.

Mae pob Cynllun yn ymdrin ag anghenion bywyd gwyllt lleol drwy gyfres o gynlluniau rhywogaethau a chynefinoedd unigol sy'n argymell gweithredu. Bydd llwyddiant y Cynlluniau yn dibynnu ar y camau ymarferol a gymerir i gyflwyno'r camau gweithredu, er enghraifft drwy warchodaeth ychwanegol i safleoedd o bwysigrwydd lleol i fywyd gwyllt.

Yn y pen draw mae gwarchod natur yn weithgaredd sy'n seiliedig ar safleoedd. Mae cadwraeth gwirioneddol yn digwydd ar ffermydd, mewn coedwigoedd, ar fynyddoedd a gweunydd, twyni tywod a morfeydd sy'n cael eu pori, y tir comin lleol, y lôn las gyda'i gwrychoedd a'r parc a'i goed. Mae'n weithgaredd sy'n dibynnu, nid ar gwmni dethol bychan ond ar y rhai hynny y mae eu penderfyniadau yn effeithio ar y safleoedd hyn. Mae rhai yn wleidyddion pwysig ond mae'r rhan fwyaf yn wleidyddion sy'n gweithredu'n lleol fel rheolwyr safleoedd, tirfeddianwyr ac fel cynghorwyr.

Mae llawer yn digwydd yn lleol. Mae Grŵp Bioamrywiaeth Cymru wedi penodi Julia Korn i gynorthwyo i gyflwyno gweithredu lleol a hwyluso Cynlluniau Gweithredu Bioamrywiaeth Lleol. Mae'r misoedd cyntaf wedi bod yn brysur iawn iddi wrth iddi ddysgu am yr hyn sy'n mynd ymlaen. Gobeithiwn roi adroddiad am lwyddo i weithredu'n lleol ynghylch bioamrywiaeth yn y rhifyn nesaf.

Green **Bookshelf**

James Robertson

The naturalist has never had it so good. Publishers have swarmed into the market, providing titles on everything from weevils to plant galls, animals on seaweeds and insects on nettles. If dragonflies are your passion, you will be able to fill a shelf with new dragonfly titles. But into this menagerie of natural life has crept, barely noticed, a new genre; books about the naturalists who have transformed our knowledge of the natural world, or the way we look at it.

The movers and shakers of the environmental movement are lining up like swallows on the wire to launch themselves into print. Now is the time to review lives and relationships, battles lost and won, and commit them to paper. Pop stars and footballers, on the instant celebrity roller coaster, grab their chance early; everyone else has to observe the rule that biographies need the critical mass of a lifetime to fuel them.

William Condry's writings about nature in Wales spanned half a century, and included forty years of his Guardian country diary 'burblings', as he called them.. His own memoir ***Wildlife, My Life*** (Gomer, 1995) is an engaging portrait of a naturalist, conservationist and friend. Nature is closely observed, and the pleasure he takes in his plant hunting and bird watching transfers itself from the page. Whatever he can do for nature he does, and his memoir is a valuable record of the story behind, for example, the bird observatory on Bardsey Island. There is also the thread of friendship which runs through this book and reveals itself in his relationship with his wife Penny; in his friendship with R.S. Thomas, who shared his passion for nature; in his affection for Evan Roberts, a great name in Welsh botany; and in the many friends who visited him or joined him on his explorations, such as Mary Richards.

Shortly before his death he completed a biography of Mary Richards. ***Wildflower Safari: The Life of Mary Richards*** (Gomer 1998) was long in the making, and well worth the wait. Mary Richards began recording the plants she found around her home in the foothills of Cadair Idris in her teens, and was still botanising there in her nineties. In between, what began at the age of 66 as a visit to friends in Africa became an obsession. Over the next 22 years she lived in Africa and surveyed the flora of thousands of square miles of rough country, becoming a world authority on African plants, having 18 species and two genera named after her, and sending some 20,000 specimens to the Royal Botanic Gardens at Kew.

From her diaries, spanning nearly seventy years and amounting to about a million words, Bill Condry conjures up an affectionate portrait of a great naturalist and an indomitable spirit. His last book is a fitting memorial to his friend Mary, to his own unpretentious, intuitive prose style, and to the natural world which they both observed so acutely, and in which they both took such joy.

Derek Ratcliffe, former chief scientist at the Nature Conservancy Council, has added his own memoir, ***In Search of Nature***, (Peregrine Books, Leeds, 2000). Ratcliffe's story starts on his grandfather's Norfolk farm, where he spent childhood summers chasing butterflies and moths and bird nesting. From there the family moved to Carlisle, and he discovered the local museum and the delights of the Solway plain and firth, Lake fells and Border moors. Gradually all the high ground in Britain and Ireland falls to his energetic pursuit of raptors and waders, upland plants, mosses and ferns.

Then in the early 1950s he began a vegetation survey of the western Carneddau as part of a research studentship based at Bangor University. He devotes a wonderful chapter to Snowdonia. Nowhere will you read a clearer explanation of the special ecology of this upland area. His love of these mountains and other wild places, and the meticulous recording of what he found, makes this story of a naturalist a must for other naturalists.

Shortly before his death, John Morton Boyd completed his own remarkable memoir ***The Song of the Sandpiper*** (Colin Baxter Photography 1999). In contrast to the writings of many a scientist, this is written from the heart, and filled with the passion for his native Scotland, its people and glorious nature which drove him.

Boyd was a scientist, but in his heart a poet; a pragmatist with a deep vein of spirituality; a romantic and yet disciplined; an artist, whose paintings and drawings adorn the book; a man of action and yet reflective; true to himself but also aware of what any situation required of him, whether he agreed with it or not. This straightforward and upright man was also complex and not without contradictions; he had all the ragged edges of a rounded human being.

The grand old man of conservation in Britain, father to the Nature Conservancy and creator of a clutch of other green organisations, such as WWF, is Max Nicholson. Now he has contributed a chapter on the early days of the Conservancy to ***Life Stories*** (Ed. Heather Newbold, University of California Press, 2000). Among the fifteen contributors to what is catchily subtitled 'Old Renowned Scientists Reflect on their Lives and the Future of Life on Earth' is the creator of the Gaia theory, James Lovelock.

Lovelock has just brought out a winning autobiography ***Homage to Gaia – The Life of an Independent Scientist*** (Oxford University Press, 2000). He tells his story well, straying beyond the scientific career to which he devoted himself, to reveal aspects of his character forged in the smog-laden air of his childhood Brixton. Perverse, a tester of conventional wisdom and despiser of soft options, he fought against adversity which was often of his own making, and which he was never prepared to accept. His talent for marketing, identified early at a job interview, has certainly done much to advance the Gaia theory. Whether you decide he invented the microwave, or the green movement itself, is another matter.

The American biologist Edward O. Wilson, who put in an appearance on David Attenborough's last television blockbuster, has added an eloquent voice to the environmental debate. Among the concepts he has developed are the rationale for biodiversity, the theory of biophilia – the innate love people have for nature – and socio-biology. His autobiography ***Naturalist***, (Allen Lane, 1995), which is now out in paperback, explores the genesis of these ideas.

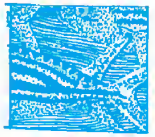
It is a serendipitous journey: he became a world authority on tropical ants only because partial blindness caused by the spines of a small perch-like fish prevented him from pursuing his passion for marine biology.

Serendipity, and what he called 'Durrell's luck', feature in ***Gerald Durrell: the authorised biography*** by Douglas Botting (Harper Collins, 1999). Possessed of virtues and vices on a grand scale, Durrell gave his heart to the animals which came into his life, many of the human variety, with reckless generosity. He is a compelling figure, a dreamer who turned dreams into reality, and who, in the process, revolutionised the role of zoos in conservation. Supplied with a superabundance of material, Botting dissects and reassembles the larger-than-life Durrell, although sadly he does not evaluate books like ***My Family and Other Animals*** which made Durrell a household name.

After only a year, the Durrell biography has gone into paperback. Here is another reason why old environmentalists have become the new rock and rollers. Biography sells. We like to read about the lives of others, especially if they have a bearing on our own lives and interests. And a great many more of us are environmentalists these days.

Silff lyfrau amgylcheddol

Mae dosbarth newydd o lyfrau wedi ymddangos ar y silffoedd yn ddiweddar, wrth i genhedlaeth o amgylcheddwyr gyrraedd cyfnod myfyrgar yn eu bywydau. Cyfrannodd Bill Condry ei atgofion ei hun am fywyd fel naturiaethwr yng Nghymru, ***'Wild Life, My Life'*** (Gwasg Gomer 1995) yn ogystal ag ysgrifennu cofiant i'r botanegydd Cymreig, Mary Richards, ***'Wildflower Safari'*** (Gwasg Gomer 1998). Mae atgofion eithriadol gan naturiaethwyr eraill yn cynnwys ***'In Search of Nature'*** (2000) gan Derek Ratcliffe, sy'n cynnwys portread ecolegol gwych o'r Carneddi, a'r llyfr telynegol gan Morton Boyd, ***'The Song of the Sandpiper'*** (Colin Baxter Photography 1999).



Marine *matters*

Rohan Holt reports on the marine scene, with contributions from **Bill Sanderson** *and* **Mandy McMath**

Subtidal survey

Over the last few summer seasons CCW's HQ subtidal team, working with our area colleagues, have made significant inroads into exploring and mapping the habitats and communities in the Pen Llŷn a'r Sarnau marine candidate Special Area of Conservation (SAC) as part of an EU funded marine SACs project. Acoustic maps, supplemented with video records from drop-down cameras and *in-situ* diver surveys have given us a broad overview of the area leading to the targeting of specific habitats and species of interest for more detailed monitoring and surveillance studies. Location markers (shaped like pyramids) designed to emit an acoustic signal to guide divers to a precise area of seabed have been installed at two locations: one on the shallow cobble reef on Sarn Badrig (St. Patrick's Causeway) in north Cardigan Bay and another in relatively deep water north of Morfa Nefyn to mark the whereabouts of an extensive bed of horse mussels *Modiolus modiolus*. Other specific interests in the Pen Llŷn a'r Sarnau special area include populations of anemones, sponges, red algae and mantis shrimps that have all been found far north of their previously recorded distributions (that even include the Mediterranean). Why they have appeared here is open to speculation: plumes of warmer water containing larvae of these species might be occasionally swept northwards from the Bay of Biscay when weather and tide conditions are suitable; it may be that these species are normally found this far north but have so far been overlooked and it could also be a sign that global warming is promoting the spread of southern and western species northwards.

Although initially hampered by poor weather, this summer's surveys into the sea caves in Wales, driven by the SAC moderation project, promise to reveal plenty of new habitats and communities and perhaps new sites for rare species such as the cave snail *Paludinella litorina*. The survey is aimed at both intertidal and fully submerged caves and tunnels and will concentrate on the caves of the Little and Great Ormes, Llŷn Peninsula and north and south-west Pembrokeshire. The project is being managed by a specialist contractor, Marine Seen in conjunction with the HQ subtidal team who hope to use various new approaches to diving and mapping the caves.

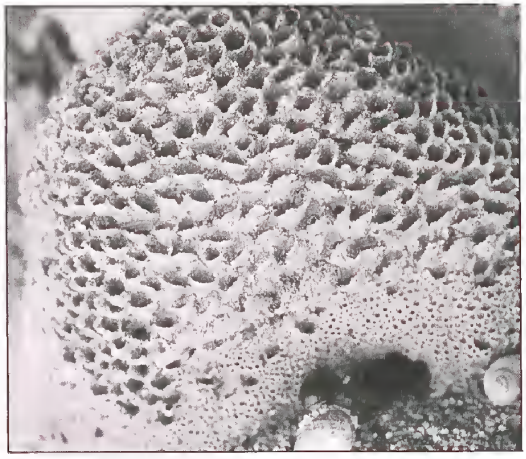
Welsh sandbanks are to be investigated this year on the maiden voyage of the new research ship *Prince Madog II* soon to be based at the School of Ocean Sciences, Menai Bridge. CCW marine specialists are aiming to improve our understanding of Wales' important sandbank habitats.

Intertidal survey

Phase 1 mapping of the intertidal zone in Wales has continued this year despite foot and mouth restrictions preventing access to the shore over farmland. The team, conducting simultaneous surveys in Pembrokeshire and North Wales, have been accessing the shore by boat and have already covered significant stretches of coastline this year. These include Caldy Island and mainland of South Pembrokeshire, where complex communities of algae and animals thrive on the broad, wave-cut platforms and in rockpools, and around east Anglesey where the communities are characterised by silt-tolerant algae and rock-boring bivalve molluscs (piddocks). The shoreline around Ynys Moelfre is of particular interest for its deeply indented gullies that support communities of anemones, soft corals and bryozoans that can tolerate the wave-surge conditions. The team have also recorded an unwelcome addition to the shore flora – large amounts of Sargassum weed *Sargassum muticum*, a native of Japan, have been found in shallow rockpools on the shore of the Menai Strait (near to the Mermaid Inn) on Anglesey. This fast-growing brown alga overgrows and displaces native species and spreads rapidly through fragmentation and producing large numbers of robust spores. It was also found by the Phase 1 team in Pembrokeshire two summers ago.

Grey seal project

The north Wales grey seal survey is well underway. Stephen Westcott has been contracted by CCW to locate all sites used by grey seals in north Wales from the Dee Estuary, around Anglesey and Pen Llŷn and on to north of Aberystwyth. Individual seals are being identified through patterns of markings around their necks that are as unique as fingerprints. This will help us understand their movements within north Wales and beyond as they are a species known to travel relatively long distances. For example, a seal photographed during CCW's west Wales grey seal census in the early nineties was also identified in Ireland. Seals are being counted at major haul-outs at least three times a month and this will include newly born pups in caves and beaches from mid-summer onwards. The information will provide a basis from which to monitor the adult and pup seal population and to assist conservation management.

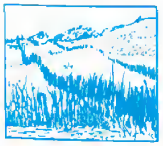


Materion morol

Mae arolwg islanw wedi cynnwys ymchwilio i a mapio'r cynefinoedd o fewn ymgeisydd am Ardal Cadwraeth Arbennig Morol Pen Llŷn a'r Sarnau. Mae mapiau acwstig, cofnodion fideo ac arolygon gan ddeifwyr wedi rhoi darlun eang o'r ardal, a mannau o ddiddordeb arbennig i'w targedu. Mae'r rhain yn cynnwys gwelyau helaeth o farchfisglod *Modiolus modiolus* a phoblogaethau o anemoniau, sbwngau, algâu coch a pherdys mantis. Mae rhai o'r rhain yn llawer pellach i'r gogledd nag a gofnodwyd yn flaenorol, a gallent fod yn arwydd o gynhesu byd-eang.

Mae arolwg rhynglanw wedi parhau, er gwaethaf cyfyngiadau ar fynediad oherwydd clwy'r traed a'r genau. Mae llawer o'r arforlin wedi cael ei arolygu mewn cychod, gan gynnwys Ynys Byr, tir mawr de Sir Benfro a dwyrain Sir Fôn. Mae amrywiaeth enfawr o anifeiliaid ac algâu yn ffynnu ar lwyfannau a dorrir gan y tonnau ac mewn pyllau creigiog, gan gynnwys cwrelau meddal. Darganfyddiad digroeso ar lan afon Menai oedd gwymon *Sargassum*, *Sargassum muticum*, sy'n frodor o Siapan ac yn lledaenu'n gyflym, ac sy'n gallu tagu rhywogaethau brodorol.

Mae prosiect yn ymwneud â morloi llwyd ar y gweill yng Ngogledd Cymru. Bydd Steven Westcott yn nodi'r holl safleoedd a ddefnyddir gan forloi llwyd o aber afon Dyfrdwy i afon Dyfi. Bydd morloi yn cael eu cyfrif a bydd symudiad unigolion, y gellir eu hadnabod o batrymau'r marciau ar eu gyddfau, yn cael eu monitro. Bydd hyn yn darparu sail ar gyfer monitro poblogaeth y morloi ac yn cynorthwyo gyda'i rheoli.



Nature *in reserve*

Mike Bailey, *Warden at Cors Fachno National Reserve, reports on a remarkable discovery linking dragonflies and atters*

Cors Fochno (Borth bog) is one of the largest and finest raised bogs in Britain. To keep it that way, we have worked hard to restore and maintain water levels over the last twenty years. The bog has a wealth of important wildlife and great palaeo-environmental value preserved in the 9m of peat, which has accumulated over the past 6,000 years. To restore a *sphagnum*-rich carpet of vegetation and the active, peat-forming conditions which were the norm prior to the extensive drainage works of the last two centuries, we need to reduce the effects of old drainage channels and peat cuttings.

The blocking of ditches large and small has created over ten kilometers of narrow waterways, producing in themselves a valuable habitat. Fox (1985) noted the increase in wildfowl, especially Teal *Anas crecca*, and dragonflies accompanying early ditch-blocking work, and this has continued. The small red dragonfly *Ceriagrion tenellum* for instance, is now breeding over a much larger area and its population explosion has doubtless helped in the recent colonisation of nearby Ynys Edwin bog at RSPB Ynys-hir Reserve.

Like the surrounding bog the linear pools are fed purely by rainfall, and are therefore very acidic and nutrient-poor. As a result few fish species are able to colonise, allowing the dragonflies to become much more populous. Eels do however occur, and likewise the Otter *Lutra lutra*, which is known to be very fond of the former.

Signs of otter presence are to be found along all the flooded ditches and their spraints often appear to contain remains of shrimps in addition to fish bones. Foraging territories clearly, therefore, take in the nearby estuarine waters of the Dyfi and Lerry Rivers. I have even found spraint by the roadside ditch at Ynyslas dunes. What I found in June 2000 along one of the flooded ditches on the bog, was however a greater surprise.

Beside an otter track through a floating carpet of *sphagnum* moss, I noticed a collection of dragonfly wings, sixteen in all, and all belonging to the readily distinguishable Four-spotted Chaser *Libellula quadrimaculata*. Further along the otter track I found a few more wings and then a spraint. Sure enough the spraint was found to contain distinctive fragments of carapace belonging to the same species. The diet of European otters has been well studied but adult dragonflies have not previously been recorded from the menu. But how, I hear you ask, could an otter catch an adult dragonfly? I can only assume that on its nocturnal foraging the opportunist otter had been reaping this seasonal harvest whilst the hapless dragonlies were roosting on the stems of ditch-side vegetation.

A few weeks later I found another collection of wings in a similar situation but 2.5km away from the first, on the western-most edge of the great bog. Although the same individual otter may have been responsible, it seems likely that the entire otter population of Cors Fochno are aware of this unlikely food source.

References

Fox, A.D. 1985. *Effects of ditch blocking on selected wildlife features at a coastal raised mire site in central west Wales.* Nature Conservancy Council Aberystwyth, Internal Report.

Natur *mewn gwarchodfeydd*

Gwnaeth Mike Bailey, Warden Gwarchodfa Natur Genedlaethol Cors Fochno, ddarganfyddiad eithriadol yn ystod y flwyddyn. Darganfu fod dyfrgwn yn bwydo ar weision y neidr a hynny mae'n debyg pan oeddent yn gorffwys ar lystyfiant ar fin y ffosydd yn y cyfnos. Gall dyfrgwn hefyd fod yn fuddiol i weision y neidr, drwy fwyta llyswennod, sydd yn eu tro yn bwyta larfau gwas y neidr.

Nature *at large*

Here ore the first reports of whot will became o regular, and we hope comprehensive, feoture on new wildlife recards, surveys ond field observations of noture at large. My thanks to **Liz Howe** *(amphibions),* **Alastair Moralee** *&* **Les Colley** *(birds), &* **Mike Howe** *&* **Adrian Fowles** *(invertebrates)*

Amphibians

The usual annual task of counting great crested newts as they display in their breeding pools has been postponed at most sites due to foot and mouth restrictions, reports Liz Howe. The peak activity for newts is during March, April and May, so many sites will have a year's gap in their monitoring data.

The Flintshire Rangers at Talacre Warren have been more fortunate in being able to monitor their re-introduced population of natterjack toads. A total count of 96 natterjacks was recorded at the beginning of April, a massive increase on last year's figures. This bodes well for good spawning and will ensure the toad minders have plenty of tadpoles to look after this year.

Birds

Anglesey had an unusual visitor in May. A white stork flapped slowly past Les Colley, the warden at Cors Erddreiniog, late one evening and roosted in a dead tree overnight. It spent the next day among sheep just outside the reserve. Although free-flying captive birds do sometimes turn up in odd places, there were no rings to be seen on this bird. The nearest breeding storks are in Holland, but strongholds are in Germany and East Europe, and Spain. The patter of tiny storks' feet is not anticipated.

Almost as remote a possibility is the return of corncrakes as breeding birds on Anglesey. A lonely male has been calling insistently for some time, and surprised golfers wondered what the noise was. Sadly, having to make such efforts to attract a mate make it unlikely that one is about. A similar tale for cuckoos has had a happier ending. A female was finally heard to answer a male which had been calling repeatedly for over a week. Having found a suitable dunnock nest, for these cuckoos were seen prospecting around hedges, they should do their bit for the next generation of cuckoos and cuckoo-watchers. This is good news, as cuckoos have been declining on Anglesey, with only three records sent in last year.

Alastair Moralee, RSPB senior site manager at South Stack, reports that terns had a very early season last year with the first arctic tern eggs recorded on Skerries on the 14th May. 2001 appears to be a little more "normal" with the first eggs seen on 22nd May. There are up to 1500 terns present on the site this summer.

Both shoveler and pochard numbers at Valley were very high in April, although numbers fell in May. The foot and mouth restrictions on survey work make comparisons with previous years difficult. The Cetti's warblers have survived the winter well and there are now 5 territories at Valley. We have 125 pairs of black-headed gulls on a newly managed island in Llyn Traffwll.

Chough numbers at South Stack are the same as last year with 11 pairs, and the same picture is emerging from other parts of Anglesey which are being checked by boat. Ringing is underway with most sites so far checked having broods of 3-4 young. At South Stack, a new peregrine eyrie can be viewed on the RSPB website at www.rspb.org.uk/webcams.

Invertebrates

Mike Howe *and* ***Adrian Fowles*** *report on last season's surveys of rare and threatened invertebrates.*

Work undertaken by Environment Agency (Wales), Cardiff University and CCW in summer 2000 has demonstrated that populations of the **freshwater crayfish *Austropotamobius pallipes*** in the River Wye and the River Usk continue to decline, although the exact causes are unknown. Surveys of the **glutinous snail *Myxas glutinosa***, rediscovered in Llyn Tegid in autumn 1998 at its only current UK locality, indicate that it is widespread in the shallow margins of the lake but does not appear to occur in similar water bodies in Snowdonia National Park.

Studies on the **shrill carder bee *Bombus sylvarum*** highlighted the importance of populations at Castlemartin Range in Pembrokeshire, which are arguably the most important in the UK. Workers were recorded over a good proportion of the 3,200 hectares of flower-rich grassland, with particularly high densities on the western part of the site. The discovery of a nest, the first found in the UK for nearly ten years, has shown that individual colonies are small, with fewer than 30 workers, and provided useful information on foraging activities. Populations at Margam Moors and Kenfig Dunes in Glamorgan are not faring so well, but the discovery of an additional population at Parc Slip Nature Reserve is encouraging. The **brown-banded bee *Bombus humilis*** is more widespread in Wales occurring as far north as Newborough Warren on Anglesey, although the majority of populations are confined to the south and south-west coast, and these are thought to be important in a UK context. The **mason bee *Osmia xanthomelana*** now appears to be restricted in the UK to the Llŷn peninsula, after searches on the Isle of Wight in 2000 failed to locate any individuals. Continuing studies by Liverpool Museum and CCW have shown that the bee breeds at two coastal cliff sites on the Llŷn, with nests being constructed in the sides of rabbit burrows and in eroding sandy banks.

Mark-recapture studies on adults of the **hornet robberfly *Asilus crabroniformis*** at a site in Meirionnydd provided information on population size and dispersal abilities. Whilst intensive searches for the **soldierfly *Odontomyia hydroleon*** at its only site in Wales in Ceredigion failed to locate larvae and found only three adults, better luck was had with determining the habitat requirements of the **stiletto fly *Cliorismia rustica***, which is associated with exposed sediments on the River Monnow and the River Usk. Progress was also made with identifying the requirements of the **cranefly *Lipsothrix nervosa***, the larvae of which are found in small, saturated, fallen timber in shaded woodland. Included in the UK BAP on account of an apparent endemic status, there are in fact recent records of this species from Germany and Switzerland.

The status of the **belted beauty moth *Lycia zonaria*** at its only Welsh locality in Caernarfonshire remains in jeopardy as a result of habitat loss and heavy public usage, although adult numbers were not markedly down on previous years. The larvae were observed to feed preferentially on bird's-foot trefoil, but they will feed on a wide variety of legumes and other plants, and initial studies to determine the selection of pupation sites suggest a preference for a partially vegetated, loose, sandy substrate. It proved to be another bad year for Welsh populations of the **high brown fritillary *Argynnis adippe*** and the **pearl-bordered fritillary *Boloria euphrosyne***. In Ceredigion, only two of the four recently occupied sites for pearl-bordered fritillary were occupied, although scrub clearance in the previous winter by the National Trust at Cwm Soden may have had an immediate impact, with relatively good numbers of adults recorded.

A major initiative during the year saw the secondment of CCWs Monitoring Ecologist for South Wales to the post of Marsh Fritillary Project Officer. In a pilot project, Julian Woodman used Phase 1 maps to identify habitat patches which contributed to twelve **marsh fritillary *Euphydryas aurinia*** populations in Glamorgan and Carmarthen. Each patch was visited and assessed against a standard conservation objective to determine its condition. Land owners/occupiers were approached to discuss possible conservation measures to improve habitat quality and an advisory leaflet on management for marsh fritillaries was distributed. Information on each patch was plotted on GIS. Following on from this, CCW organised a Marsh Fritillary Action Group for Wales (MFAGW) and a one-day seminar was held in Bridgend in October 2000. Forty representatives from all major organisations with responsibility for marsh fritillary conservation in Wales attended and a series of action points was identified from wide-ranging discussions which took place during an open forum.

Acknowledgements

Nigel Ajax-Lewis, Pete Boardman, Claire Carvell, Mike Clark, Carl Clee, Alex Coley, Mike Edwards, Andy Godfrey, Dylan Lloyd, Annie Poole, Peter Skidmore, Fred Slater, Richard Smith, Simon Spencer, Rob Whitehead, Martin Willing, David Woolley.

Natur *y byd*

Bydd y golofn hon yn dod yn nodwedd reolaidd ac yn rhoi adroddiadau am gofnodion bywyd gwyllt newydd, arolygon ac arsylwadau yn y maes ar natur yn gyffredinol. Nid yw'r cyfyngiadau yn dilyn clwy'r traed a'r genau wedi gwneud recordio a monitro bywyd gwyllt yn hawdd hyd yma eleni. Mae'r dasg flynyddol o gyfri'r madfallod dŵr cribog wrth iddynt arddangos eu hunain yn eu pyllau magu wedi ei ohirio. Ond mae maestirwyr yn Nhalacre wedi gallu monitro'r poblogaethau o lyffantod y twyni sydd wedi cael eu hail-gyflwyno.

Mae ciconia gwyn wedi bod yn ymweld ag Ynys Môn y gwanwyn hwn, ac mae cri un rhegen yr ŷd wedi ei chlywed yn barhaus. Er bod y gwcw yn mynd yn brin iawn ar Ynys Môn, clywyd un iâr yn ateb ceiliog. Mae teloriaid Cetti yn stori o lwyddiant ac mae pump pâr wedi goroesi'r gaeaf.

Mae arolygon o infertebratau prin a rhai sydd o dan fygythiad wedi canfod bod nifer o rywogaethau yn fwy cang nag y credid yn flaenorol, er bod y llynedd wedi bod yn flwyddyn ddrwg arall i'r fritheg frown a britheg y gors. Bu Julian Woodman yn gweithio ar gynllun mawr i nodi cynefinoedd sy'n cynnal y poblogaethau o fritheg y gors sydd ar ôl ym Morgannwg a Chaerfyrddin. Bu'n siarad hefyd â thirfeddianwyr ac yn dosbarthu taflenni, ac yn dilyn y gwaith hwn, ffurfiwyd grŵp gweithredu i symud ymlaen gydag achub yr iâr fach yr haf hon sy'n prinhau ac o dan fygythiad.

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